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Classification Guide to



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PENNSYLVANIA FISHES

by Clark Shiffer



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Identification guide to
Pennsylvania fishes

Identification Guide To **PENNSYLVANIA FISHES**

by
Clark Shiffer

Edited by Larry L. Shaffer
Illustrations by George Lavanish

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by the*
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INTRODUCTION

This publication is an expanded and revised version of an earlier Pennsylvania Fish and Boat Commission publication by Keen Buss and Jack Miller entitled "Identifying the Common Fishes of Pennsylvania." Like its predecessor, this publication is intended to help the reader to name, or identify, some of the species, subspecies or varieties of fishes commonly found in Pennsylvania. While the original publication treated 32 species, subspecies, or varieties in five families, this publication discusses 64 species, subspecies, or varieties in 16 families. Considering that about 160 species of fishes swim in Pennsylvania waters, and that another 10 or more may also be found here eventually, species coverage in this book is very selective. The "Key To Selected Families of Pennsylvania Fishes", found on page one, uses major identifying characteristics to help sort out the various fishes. The Key includes all except nine families and is intended for use with fully-grown or mature fish. It is therefore more likely that a given individual fish can be placed in the proper family at least, even though it may not be able to be identified to the species level. This is particularly true of the family Cyprinidae (minnows) with the largest number of similar looking species.

Technical terms have been kept to a minimum since illustrations are provided that highlight distinguishing features. The illustrations should be used along with the characteristics given in the Key and the additional information in the text. Color is useful, but will vary with changes in the physical or physiological state of each fish, or with environmental changes. Scientific names are used for each species which serve to fix their unique identities, since these names do not change like common names no matter where the species is found.

The range of a particular species within the state is given when it is found, or expected to be found, in only a limited area, or when this information is especially useful in separating similar species or subspecies.

The number of species covered in this book is necessarily limited. However, this publication includes those game fishes and panfishes that anglers should be able to identify, since season, size, and creel limit regulations are established for specific species.

Whether an angler or not, the reader should be able to identify these species and some additional species not usually considered to be game fishes or panfishes, since identifying our common fishes should be common knowledge. Most of these species, and a great deal of information about them, are included in the Commission publication by Larry L. Shaffer entitled "Sport Fishes of Pennsylvania."

KEY TO SELECTED FAMILIES OF PENNSYLVANIA FISHES

Beginning with 1a and 1b below, match the information to the characteristics of the fish you wish to identify. When you have placed your specimen in its proper family, go to the page number indicated for help in determining the specific species. As you progress through the Key, refer to Figures 1 and 2 and the Glossary as may be necessary.

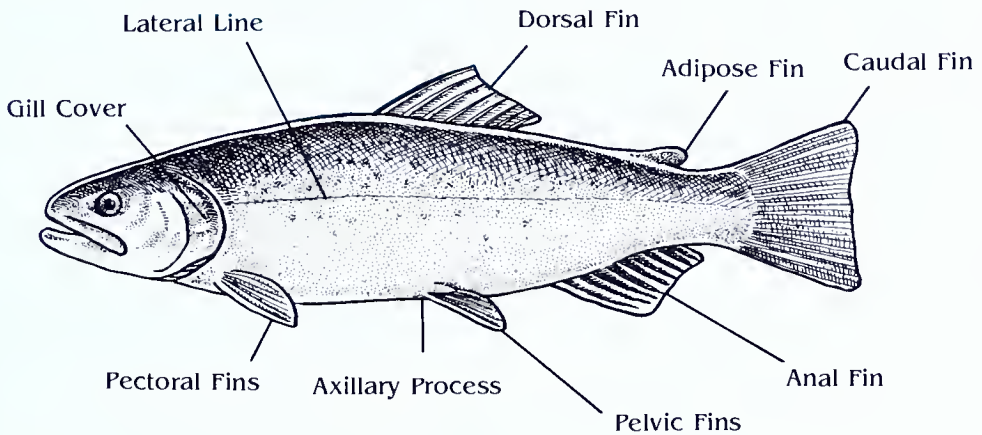
- 1a.** Head with jaws; no pelvic fins; body long and "snake-like":
Eel Family - Anguillidae; Page 7.
- 1b.** Pelvic fins present; body not long and "snake-like":
Go to 2
- 2a.** Upper portion of caudal (tail) fin base longer than lower portion:
Go to 3
- 2b.** Upper and lower portions of caudal fin base about equal in length:
Go to 5
- 3a.** Vertebrae extend into elongated upper portion of caudal fin; snout with four barbels on underside; body with separate rows of bony plates: **Sturgeon Family - Acipenseridae;** Page 4.
- 3b.** Vertebrae not noticeably extended into upper portion of caudal fin; tail somewhat rounded: **Go to 4**
- 4a.** Jaws long and thin with many teeth; scales thick and bony; dorsal fin short: **Gar Family - Lepisosteidae;** Page 6.
- 4b.** Jaws short and thick; dorsal fin very long: **Bowfin Family - Amiidae;** Page 7.
- 5a.** Adipose fin present: **Go to 6**
- 5b.** Adipose fin not present: **Go to 7**
- 6a.** Body scaleless with chin barbels present: **Catfish Family - Ictaluridae;** Page 29.
- 6b.** Body with small scales; no chin barbels; body distinctly spotted; thin pointed flap of skin (axillary process) at base of pelvic fins: **Trout Family - Salmonidae;** Page 11.
- 6c.** Body with large scales; no axillary process at base of pelvic fins: **Smelt Family - Osmeridae;** Page 18.
- 7a.** Stout duck-bill snout and jaws with obvious sharp teeth; single dorsal fin with no spines: **Pike Family - Esocidae;** Page 19.

- 7b.** Not with duck-bill snout; dorsal fin single or double with both spines and soft rays or soft rays only: **Go to 8**
- 8a.** Single soft-rayed dorsal fin completely forward of anal fin; mid-belly scales sharp and "saw-toothed"; silvery body *strongly* flattened from side to side; no lateral line: **Herring Family - Clupeidae**; Page 8.
- 8b.** Single or double dorsal fin; lateral line present; "saw-toothed" mid-belly scales absent; body not strongly flattened from side to side: **Go to 9**
- 9a.** Single soft-rayed dorsal fin (include carp and goldfish which have first ray hardened); one or more large pharyngeal (throat) teeth on separated fifth gill arches: **Go to 10**
- 9b.** Dorsal fin single or double with both spines and soft rays; pharyngeal teeth present or absent (freshwater drum has teeth on fused pharyngeals): **Go to 11**
- 10a.** Mouth directed downward with thick fleshy lips; distance from back edge of gill flap to beginning of anal fin *much greater* than distance from beginning of anal fin to base of tail fin; pharyngeal teeth more than 15 and in single row: **Sucker Family - Catostomidae**; Page 26.
- 10b.** Mouth not with thick fleshy lips; distance between back edge of gill flap to beginning of anal fin *only slightly greater* than distance from beginning of anal fin to base of tail fin; pharyngeal teeth no more than 6 in one to three rows: **Minnow Family - Cyprinidae**; Page 22.
- 11a.** Body largely scaleless (small prickles present); large pectoral fins; head broad and flattened: **Sculpin Family - Cottidae**; Page 44.
- 11b.** Body with scales: **Go to 12**
- 12a.** Anal fin with 3 or more spines: **Go to 13**
- 12b.** Anal fin with 1 or 2 spines: **Go to 14**
- 13a.** Gill cover with spine: **Temperate Bass Family - Percichthyidae**; Page 32.
- 13b.** Gill cover without spine: **Sunfish Family - Centrarchidae**; Page 34.
- 14a.** Lateral line ending at base of caudal fin: **Perch Family - Percidae**; Page 41.
- 14b.** Lateral line continues to end of caudal fin; soft-rayed portion of dorsal fin longer than spiny portion; large flat teeth present on heavy, fused lower pharyngeals: **Drum Family - Sciaenidae**; Page 43.

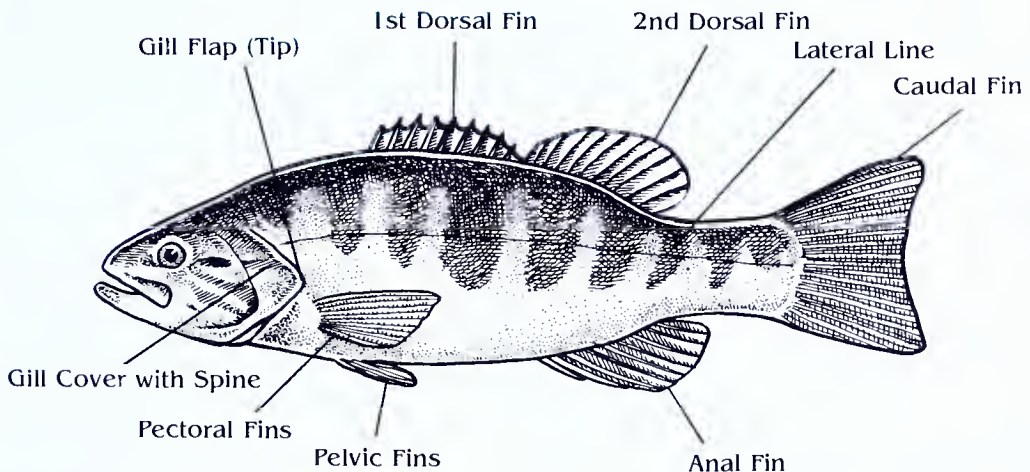
ANATOMY OF FISHES

The external appearance (or morphology) of fishes varies from species to species, and these variations can be used to help identify one from another. Among other things, fishes come in a variety of shapes, and the number, structure and placement of fins also vary. Fish generally are divided into two broad categories, soft-rayed and spiny-rayed. They are shown in Figures One and Two and an understanding of each will be helpful in the text that follows.

*Figure 1 - **Soft-Rayed Fish***



*Figure 2 - **Spiny-Rayed Fish***



THE STURGEONS

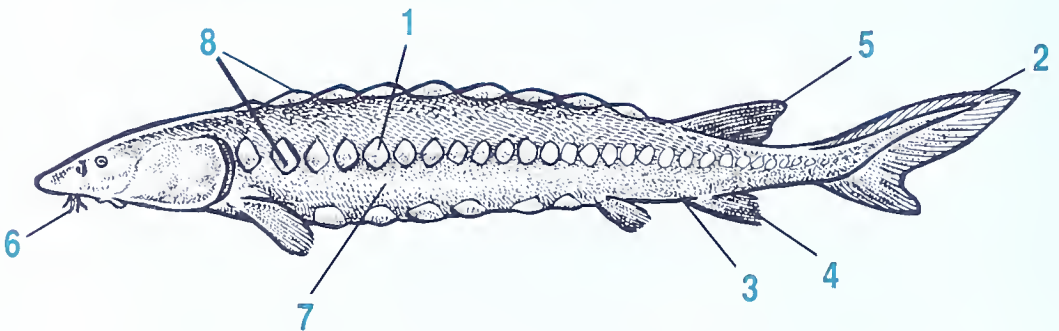
(Family Acipenseridae)

Sturgeons are considered the most primitive of our bony fishes, occurring in both fresh and salt water environments around the world. Depending on the species and locality, five to 20 or more years may be required to attain reproductive maturity, with reproduction occurring at varying intervals thereafter. The life span ranges from 50 to 100 or more years in the various species.

Three species are currently known to occur in Pennsylvania: the **shortnose sturgeon** (*Acipenser brevirostrum*); **lake sturgeon** (*A. fulvescens*); and **Atlantic sturgeon** (*A. oxyrinchus*). All are found in limited numbers in our boundary waters. There are no open fishing seasons in Pennsylvania for any of the sturgeons. The shortnose sturgeon and lake sturgeon are currently listed as endangered species by the Pennsylvania Fish and Boat Commission; the shortnose sturgeon also is listed as endangered by the U.S. Fish and Wildlife Service. The lake sturgeon is from Lake Erie, while the shortnose sturgeon is known only from the Delaware River. The Atlantic sturgeon occasionally is seen from streams in the southeastern corner of the state and is listed as a threatened species.

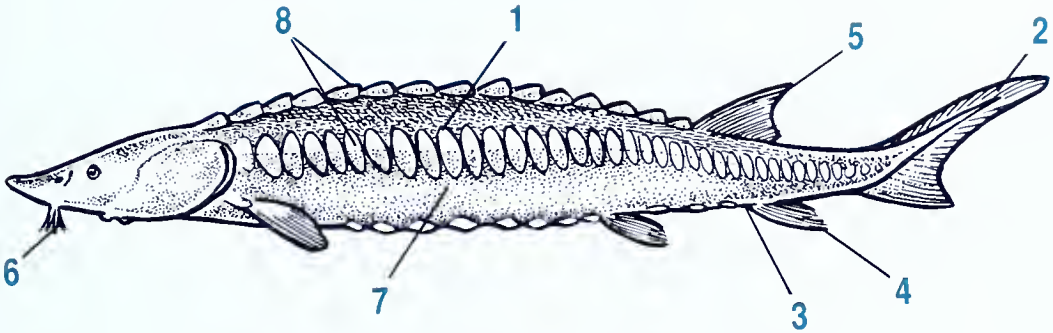
Like the bowfin and gars, the sturgeons have the upper lobe of the tail fin base longer than the lower; this is especially noticeable in the sturgeons. In addition, five separate rows of bony plates shield the body. At an average length of 10 feet, the Atlantic sturgeon is our largest fish. The lake sturgeon attains a length of five to seven feet, while the shortnose sturgeon can reach three feet.

Figure 3 - **Shortnose Sturgeon**



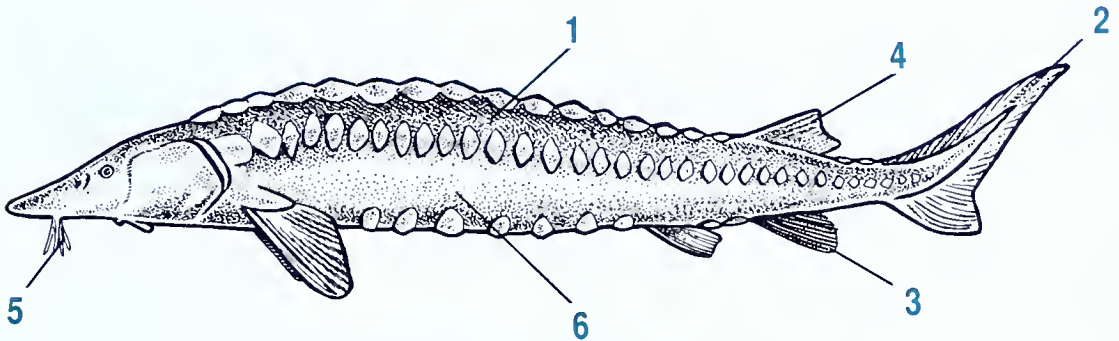
1. Five rows of bony plates.
2. Upper lobe of tail longer than lower lobe.
3. Front of anal fin lines up with front of dorsal fin.
4. Anal fin with 19 to 22 rays.
5. Dorsal fin with about 41 rays.
6. Four barbels in front of mouth.
7. Body is brownish.
8. Back and side plates paler than body.

Figure 4 - **Lake Sturgeon**



1. Five rows of bony plates.
2. Upper lobe of tail longer than lower lobe.
3. Front of anal fin lines up with middle of dorsal fin.
4. Anal fin with 25 to 30 rays.
5. Dorsal fin with 35 to 39 rays.
6. Four barbels in front of mouth.
7. Body is brownish and sometimes mottled.
8. Back and side plates same color as body.

Figure 5 - **Atlantic Sturgeon**



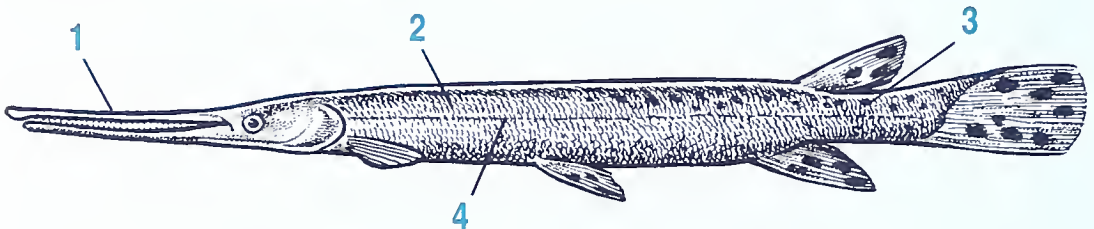
1. Five rows of bony plates.
2. Upper lobe of tail longer than lower lobe.
3. Anal fin with 27 rays.
4. Dorsal fin with 38 to 46 rays.
5. Four barbels in front of mouth.
6. Back and side plates white against blue black on the upper body to brownish on the lower sides.

THE GARS

(Family Lepisosteidae)

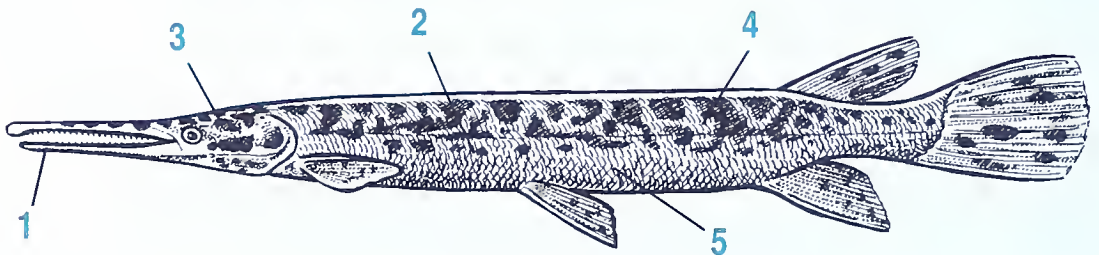
This ancient group of fishes is represented by two confirmed, but uncommon, species in Pennsylvania, the **longnose gar** (*Lepisosteus osseus*) and **spotted gar** (*L. oculatus*). Both are found principally in the shallow waters of Lake Erie, especially in Presque Isle Bay. Our species typically range from about 30 to 50 inches in length, whereas the alligator gar (*L. spatula*) of the southern United States may reach 12 feet.

Figure 6 - **Longnose Gar**



1. Upper and lower jaws form long and slender snout.
2. Body covered with thick bony scales.
3. Rear portion of body with a few small spots.
4. Body is olivaceous above and silvery below.

Figure 7 - **Spotted Gar**



1. Jaws extend to form long snout.
2. Body covered with thick bony scales.
3. Top and sides of head covered with large round spots.
4. Upper part of body with scattered large spots.
5. Body olivaceous above and silvery below.

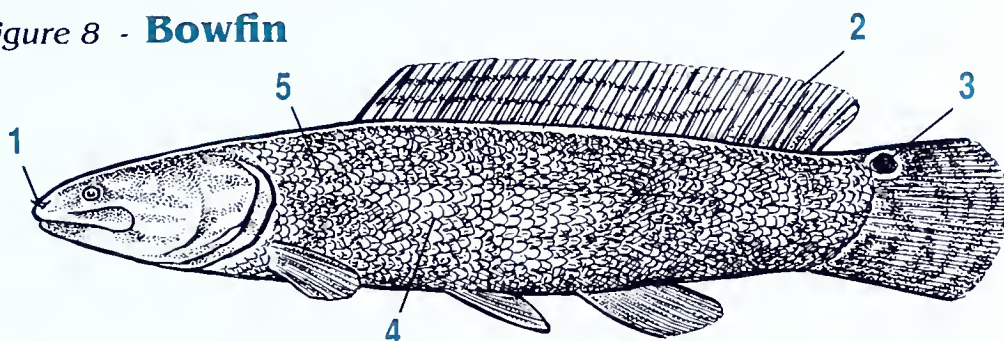
During the late spring to early summer spawning period, gars deposit large numbers of small, dark green eggs over a gravelly or vegetated bottom in stream and lake shallows. The eggs are poisonous to man, other mammals and birds. They hatch within a week. The young gars suspend themselves above the bottom, attached there to vegetation by means of an adhesive nose pad. They grow very rapidly.

THE BOWFIN

(Family Amiidae)

The **bowfin** (*Amia calva*) is another fish of ancient lineage and is the sole survivor in this country of the order **Amiiformes**, the family **Amiidae**, and the genus *Amia*. Like the gars, its body is covered with heavy scales, and it has an air bladder enabling it to breathe out of water. The bowfin has a single long dorsal fin that is separated from the broadly rounded tail fin. A pair of short barbels is found in the area of the nostrils. Males possess a dark spot at the base of the tail fin, which is ringed with bright greenish yellow or orange in the breeding season.

Figure 8 - **Bowfin**



1. Pair of short barbels near nostrils.
2. Long dorsal fin separated from caudal fin.
3. Dark spot rimmed with lighter color at base of tail.
4. Body olive green on the back, lighter on the sides.
5. Body covered with bony scales.

Breeding takes place any time from April to June. The male bowfin clears a circular nest in weedy shallows in which the eggs of several females may be deposited. He guards the eggs until they hatch and then herds the fry until they can fend for themselves.

The bowfin is a fierce and voracious predator, feeding mostly upon other fish, although it also eats crayfish and frogs.

THE FRESHWATER EELS

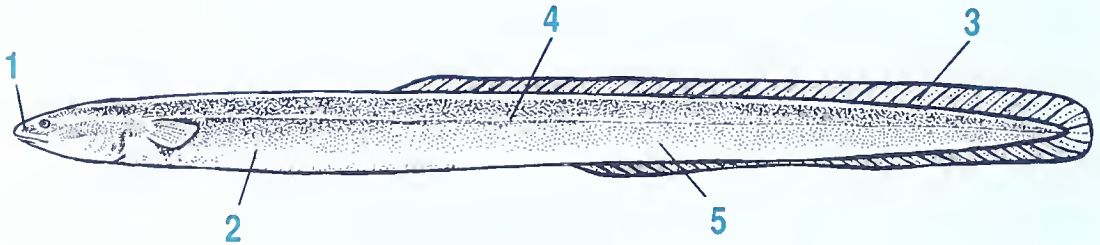
(Family Anguillidae)

The only North American representative of this family is the **American eel** (*Anguilla rostrata*). Like many other fishes, the eel's body is covered with scales. However, they are minute and embedded in the skin.

Unlike any other Pennsylvania fishes, adult eels presumably spawn in the Sargasso Sea near Bermuda and die soon thereafter. Their offspring, nearly transparent larvae called leptocephali, eventually make their way

in the spring to our coastal streams. Immature males remain at the mouths or lower reaches of these streams, while immature females ascend to the headwaters of those streams lacking any major dams or other obstructions. Females may remain upstream for ten or more years and then descend again in autumn to join with the males on a seaward spawning migration. By this time, females may have reached maximum lengths of about 4 feet, while males are usually less than half that length.

Figure 9 - **American Eel**



1. Head with upper and lower jaws.
2. Pelvic fins are absent.
3. Dorsal fin connects to tail and anal fin.
4. Body very long and slender.
5. Body yellowish brown with minute scales.

THE HERRINGS

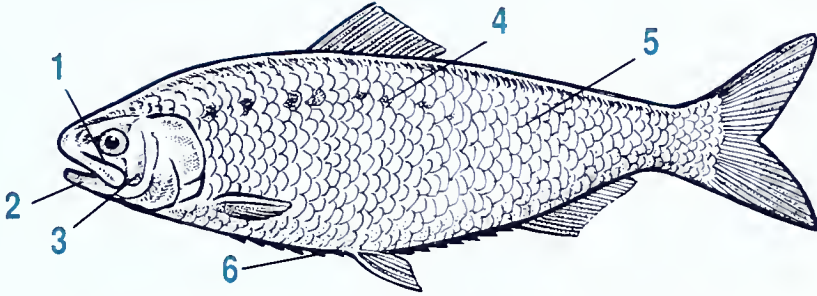
(Family Clupeidae)

Six species of this family of marine and freshwater forms are known to occur in Pennsylvania. Of these, the **skipjack herring** (*Alosa chrysochloris*) is the rarest; only a few individuals have been taken from the Ohio River in recent years. All members of this family have mid-belly scales that are sharpened in "saw-tooth" arrangements. All species lack a lateral line along the sides, and their bodies are strongly compressed from side to side (looking head-on, the body is quite narrow). All herrings are covered with bright silvery scales.

All of the species are spring spawners; some migrate greater distances than others up freshwater streams, while others spawn in brackish estuarine waters or in lake shallows. Large numbers of eggs, or roe, are broadcast over varied types of bottom material. The roe of the American shad are considered a delicacy. As they grow, the young of many species provide important forage for various game fishes, and some are important as bait. Adult American shad are the focus of an important early spring recreational fishery.

The **American shad** (*Alosa sapidissima*) is the largest member of the family, averaging 15 inches in length with females reaching weights of six to seven pounds. One to three dark spots, fading toward the rear, are present on the upper sides of the deep, silvery body. The upper and lower jaws are about equal and lack teeth in the adult. The hindmost corner of the upper jaw (maxillary) extends back to the rear margin of the eye. The side of the head between the eye and gill cover (cheek) is deeper than it is long.

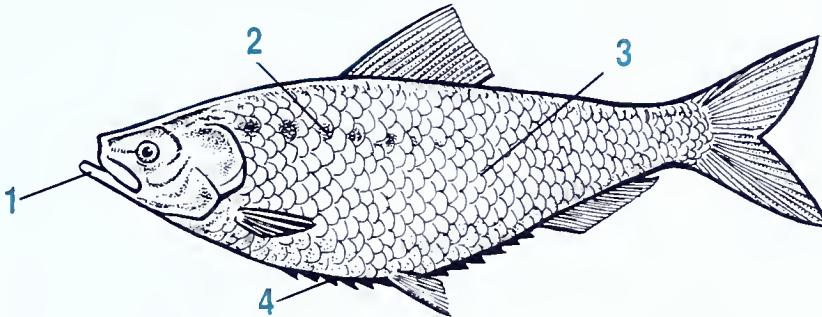
Figure 10 - **American Shad**



1. Upper jaw extends back to beneath rear margin of eye.
2. Lower jaw does not extend beyond upper jaw.
3. Silvery area on cheek deeper than it is broad.
4. Few faint spots.
5. Silvery body somewhat bluish above.
6. Saw-toothed edge on belly scales.

The **hickory shad** (*Alosa mediocris*) is a smaller species, seldom exceeding two pounds. A row of dark spots, fading as they extend rearward, are present on the upper sides. The lower jaw extends beyond the upper jaw. Though the center of its Atlantic coastal distribution is the Chesapeake Bay area, it is only occasionally encountered in the lower Delaware River of Pennsylvania.

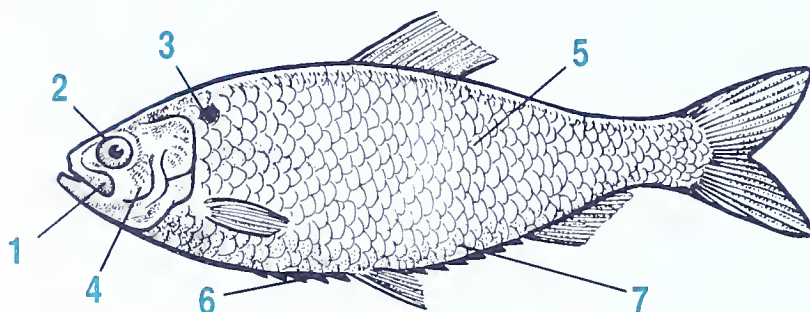
Figure 11 - **Hickory Shad**



1. Lower jaw extends beyond upper jaw.
2. Several dark spots fading toward the rear.
3. Silvery body is bluish above.
4. Saw-toothed edge on belly scales.

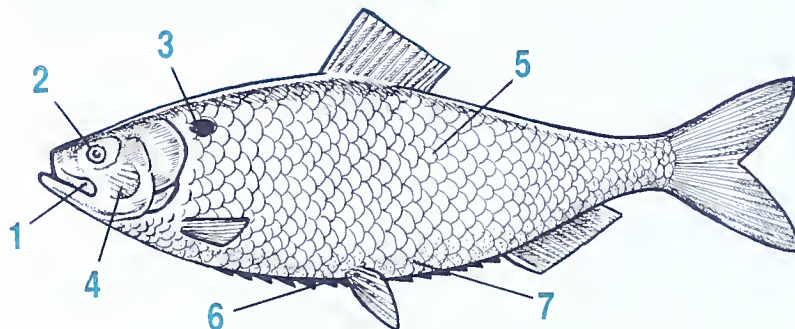
The **alewife** (*Alosa pseudoharengus*) is outwardly similar to the **blueback**, or **glut herring** (*Alosa aestivalis*). The primary difference between the two is internal, the silver-gray body cavity lining (called the peritoneum) of the alewife and the black cavity lining of the blueback herring. The eye of the alewife is wider than the distance between the tip of the snout and the eye's front margin; the blueback's eye is smaller. Both species have a single dark spot behind the upper gill cover, a cheek that is longer than it is deep, and a lower jaw that projects slightly beyond the upper jaw. Also, the maxillary in both extends back to the middle of the eye. Weights seldom exceed one pound for either species.

Figure 12 - **Alewife**



1. Upper jaw extends back to beneath middle of eye.
2. Eye quite large.
3. Usually one dark spot.
4. Cheek broader than deep.
5. Back gray green to bluish above, silvery below.
6. Saw-toothed edge on belly scales.
7. Body cavity lining silver gray.

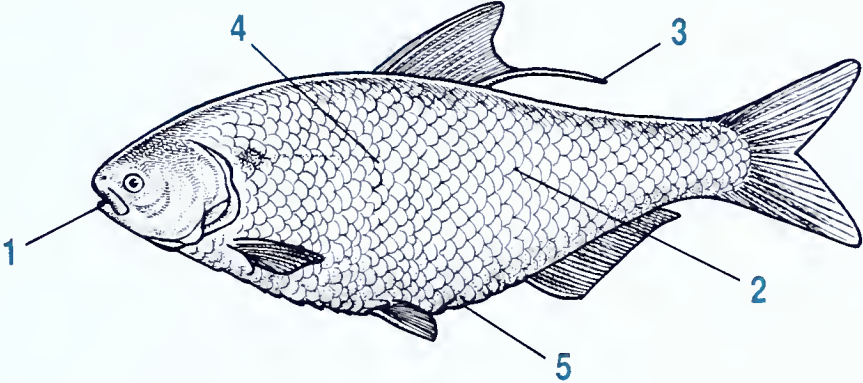
Figure 13 - **Blueback Herring**



1. Upper jaw extends back to beneath middle of eye.
2. Eye is small.
3. Usually one dark spot.
4. Cheek broader than it is deep.
5. Back blue green over silvery body.
6. Saw-toothed edge on belly scales.
7. Body cavity lining black.

The **gizzard shad** (*Dorosoma cepedianum*) seldom exceeds 18 inches in length. Its lower jaw is slightly shorter than the upper jaw when closed, and the last ray of its dorsal fin is drawn out in a thin filament. When young, this species provides a forage base for bass and other species in impoundments and large lakes, but becomes unavailable to many predators as it grows. Like some other members of the family that inhabit still waters, its populations are subject to sudden mass die-offs.

Figure 14 - **Gizzard Shad**



1. Lower jaw shorter than upper jaw.
2. No lateral line.
3. Long filament at hind corner of dorsal fin.
4. Body silvery.
5. Saw-toothed edge on belly scales.

THE TROUT AND SALMON

(Family Salmonidae)

Four species of trout and four species of salmon are known to inhabit Pennsylvania waters. In addition, a fifth salmon species, the pink salmon, occurs in Lake Erie and may be found in Pennsylvania waters. All are characterized by having an adipose fin, a prominent axillary process at the base of the pelvic fins and small scales.

Figure 15 - **Comparison of Tail of Trout**



1. Lake Trout deeply forked.
2. Other trout not forked, some almost squarish.
3. Adipose fin.

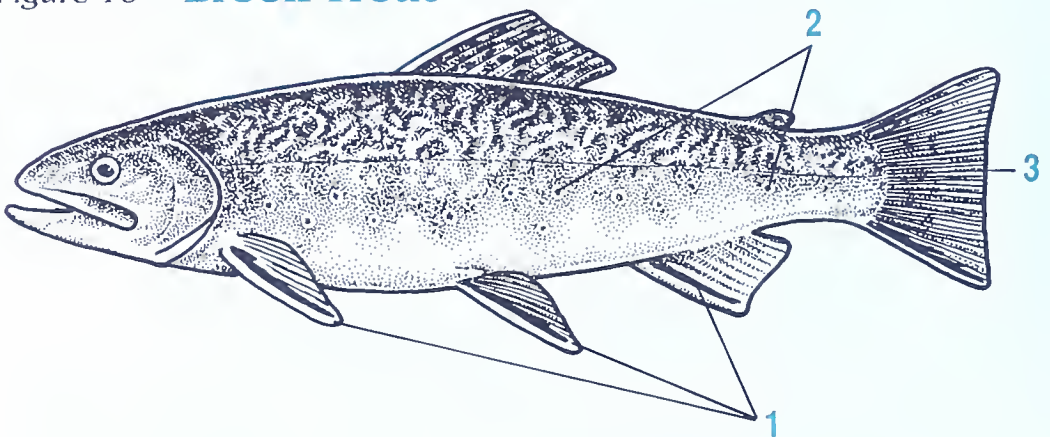
The brook trout and lake trout are the only members of this family native to Pennsylvania. Various brown trout strains were imported from Europe and Scotland, and the Atlantic salmon occurs in northern Atlantic Ocean waters. The remaining species were imported from Pacific Coast waters. Pennsylvania populations of the Atlantic salmon and sockeye salmon are landlocked.

Aside from the rainbow trout, which spawns naturally in the spring, all of our species are fall spawners. Spawning takes place over gravel and rubble bottoms of lakes and streams. Many of our lake populations migrate in large numbers into tributary streams to suitable spawning sites. Aside from sometimes covering the eggs with loose gravel, no care is given the eggs or young.

Because our trout and salmon easily adapt to artificial propagation and possess highly valued sporting and eating qualities, they have risen to a prominent position in Pennsylvania's fisheries management programs.

The **brook trout** (*Salvelinus fontinalis*) is the official Pennsylvania state fish. Individuals from wild, natural headwater stream populations may only reach five to six inches, but in other situations wild brookies may grow to be 20 inches. The back of this beautiful fish ranges in colors from light to dark olive gray or black, with light cream to olive irregular, worm-like markings. These markings continue to the upper portion of the square-tipped caudal fin or tail. The sides are paler, dull silvery with cream spots and scattered red spots with blue halos. The dorsal fin is spotted, and the lower fins are edged with white in front, becoming black and pinkish red behind. Brighter orange red marks the fins and lower sides of spawning males, and the white belly becomes blackish.

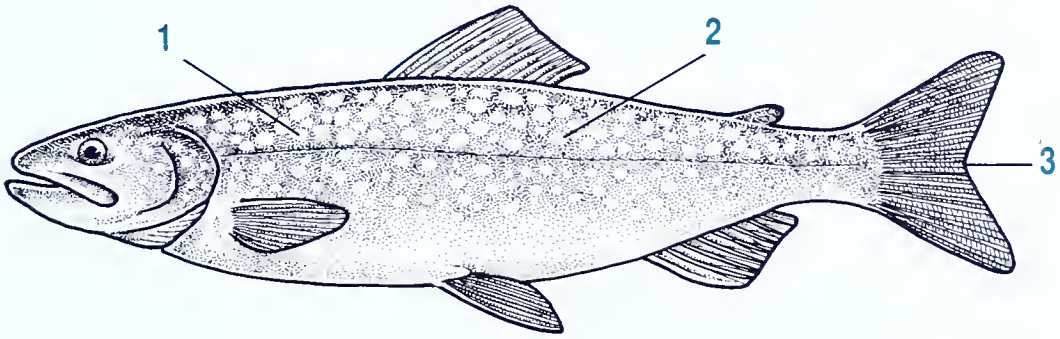
Figure 16 - **Brook Trout**



1. Front edge of lower fins lined in white.
2. Usually red spots with bluish halos on body.
3. Tail is squarish.

The **lake trout** (*Salvelinus namaycush*) is a large species closely related to the brook trout, reaching a length of nearly three feet in Pennsylvania. The back and upper sides are dark to light olive gray with many cream to whitish, irregular spots. The belly is white. The caudal fin is also speckled with light spots; it is deeply forked.

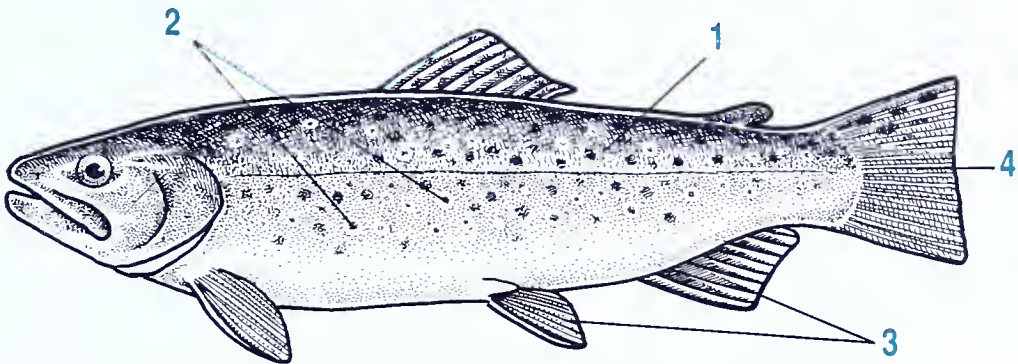
Figure 17 - **Lake Trout**



1. Body olive tone in color, sometimes gray.
2. Light speckles cover almost entire body.
3. Tail deeply forked.

The **brown trout** (*Salmo trutta*) may reach a length of about 38 inches, and is somewhat more tolerant of higher water temperatures than the brook trout. The back and upper sides vary from a dark brown to gray brown color, shading to yellow brown or silvery on the lower sides next to the white belly. Large dark spots mark the back and sides, along with a smaller number of red-orange spots with pale halos.

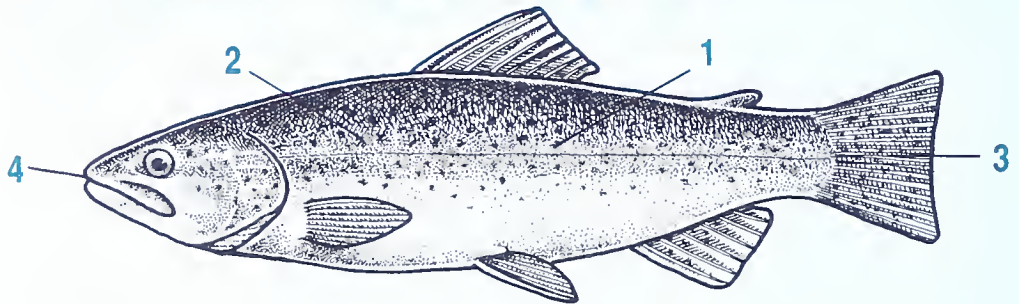
Figure 18 - **Brown Trout**



1. Body golden brown.
2. Scattered large dark spots with pale halos on body; reddish or yellow spots often seen.
3. Yellowish-brown fins are unmarked.
4. Few or no spots on tail.

The **rainbow trout** (*Oncorhynchus mykiss*) may reach a length of about 30 inches in Pennsylvania. Of all our trout, it is most tolerant of higher water temperatures, but least tolerant of acid waters. The back is a medium to light olive and profusely black-spotted. Small black spots also appear on the dorsal fin, tail, and lower sides. A broad band of silvery pink to pale orange extends along the middle of each side from the cheek to the base of the tail. The belly is white. Rainbow trout living and maturing in the ocean or large freshwater lakes become very silvery and are called "steelheads." The pink side stripes are less obvious in this form. The whitish inside of the steelhead's mouth contrasts with the darker mouths of the salmon it may resemble.

Figure 19 - **Rainbow Trout/Steelhead**



1. Greenish body, adults usually have a pinkish lateral stripe. Steelheads are more silverish and the stripe may not be predominant.
2. Usually many small black spots on body.
3. Tail heavily spotted.
4. Inner mouth and gums are white.

The **Palomino trout** is a genetic variety of the rainbow trout, derived by crossing the normally colored rainbow with a golden-colored rainbow mutant (West Virginia "Golden Trout"), which first appeared in a West Virginia hatchery. The Pennsylvania Fish and Boat Commission continues to maintain the mutant golden strain and produce the Palomino for stocking in certain waters and in limited numbers.

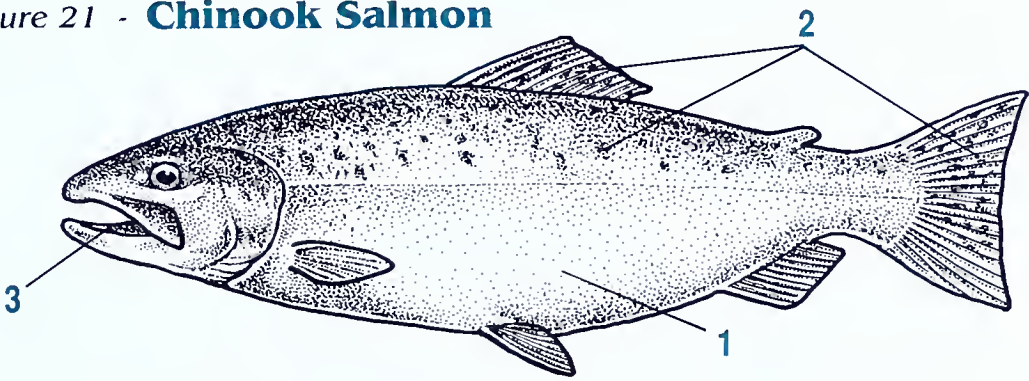
Figure 20 - **Palomino Trout**



1. Body off-white to deep yellow or golden orangish.
2. Sides unmarked except for possible darker orange lateral line stripe, similar to rainbow trout.
3. Tail somewhat squarish.

The **chinook or king salmon** (*Oncorhynchus tshawytscha*) may reach lengths of 33 to 36 inches, with occasionally recorded weights of 30 pounds in Pennsylvania. The top of the head, back and upper sides are iridescent green to blue green with flecks of gold. The sides are silvery, and the belly is silvery or white. A few black spots usually are found on the top of the head, back, upper sides and all of the fins. Both lobes of the caudal fin or tail are spotted, the upper lobe more profusely than the lower. The inside of the mouth, tongue and lower gums are black.

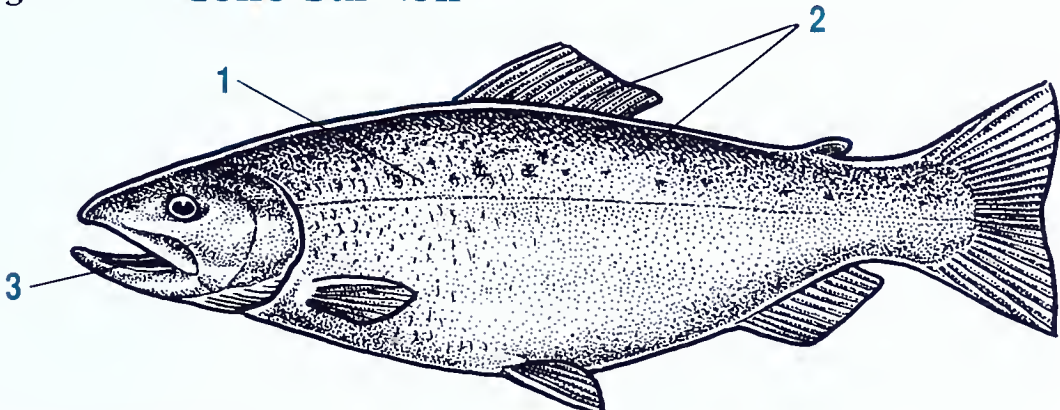
Figure 21 - **Chinook Salmon**



- 1. Silverish belly and sides, shading into greenish or blue green above.
- 2. Large black spots cover the upper sides, tail and fins.
- 3. Mouth is totally black.

The **coho or silver salmon** (*Oncorhynchus kisutch*) in Pennsylvania may grow to be 24 to 26 inches. The upper sides of the body are steel blue or greenish, shading to silvery on the lower sides and to whitish on the belly. Small black spots are scattered over the back, upper sides and the base of the dorsal fin. Black spots are present in varying amounts on the upper lobe only of the tail; the lower lobe normally has no spots at all. While the inside of the mouth and tongue are black, the lower gums are usually a paler gray.

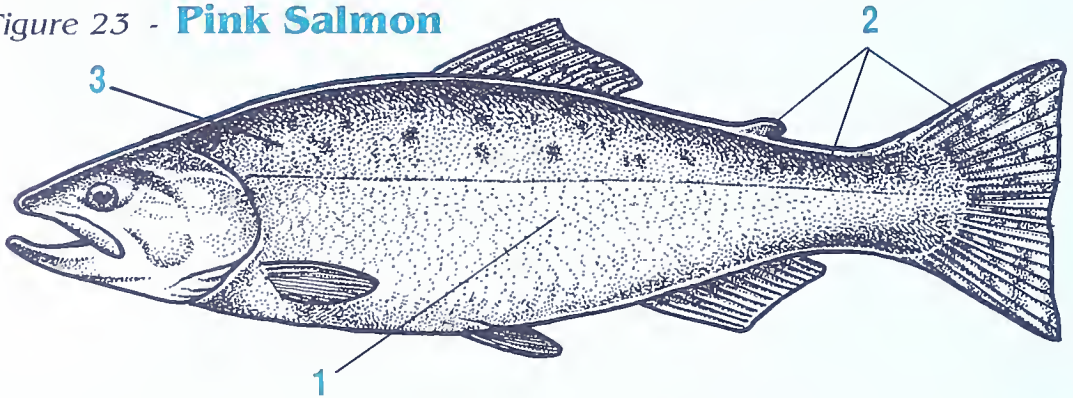
Figure 22 - **Coho Salmon**



- 1. Body bluish or greenish above shading to silvery sides.
- 2. Small spots on upper sides and on dorsal fin; none on tail.
- 3. Mouth is black with gray-white gums.

The **pink salmon** (*Oncorhynchus gorbuscha*) may reach lengths of 24 inches in an ocean environment, but seldom more than 18 to 20 inches in fresh water. Large, dark oval spots are found on the adipose fin, tail and the upper sides of the body. The upper surfaces are blue to blue green. The sides are silvery and in breeding males become pale reddish with greenish-brown blotches. Breeding males also develop elongated jaws, the upper one longer and hooked downward. In addition, a noticeable hump appears on the back between the head and dorsal fin. Counting the number of scales in the row just above the lateral line can be helpful in separating the pink from other species of salmon. The pink salmon has 169 or more scales in this row compared to less than 155 on other species. It's believed the pink salmon arrived in Lake Erie as a result of British Columbia stocks that were introduced into Lake Superior.

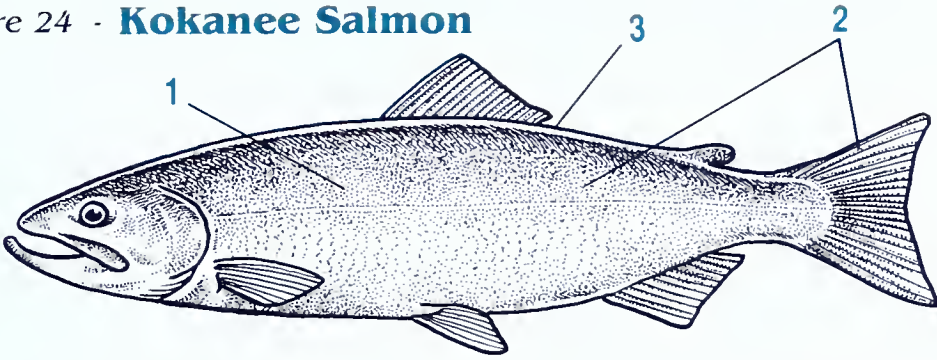
Figure 23 - **Pink Salmon**



1. Body silvery with blue to blue-green back.
2. Tail, adipose fin and upper sides covered with dark, oval spots.
3. Row of scales above lateral line has 169 or more scales; other salmon have less than 155.

The **kokanee** (*Oncorhynchus nerka kennerlyi*) is a landlocked form of the sockeye or red salmon (*Oncorhynchus nerka*). As such, it does not grow as large, attaining lengths of less than two feet. Non-breeding specimens are steel blue to greenish on the upper sides, silvery on the sides and white on the belly. During the spawning season, kokanee salmon may appear in one of two different color phases. In the most common, both the male and female become bright red over the back and on the sides, shading to gray red on the belly. The head becomes bright green to olive. The dorsal, adipose and anal fins are red, and the tail and lower fins are green to blackish. On other occasions, spawning kokanee may be purplish blue on the back and silvery on the sides. Breeding males of the red form, develop an enlarged, hooked upper jaw (called a kype) which is characteristic of spawning males of all Pennsylvania's trout and salmon.

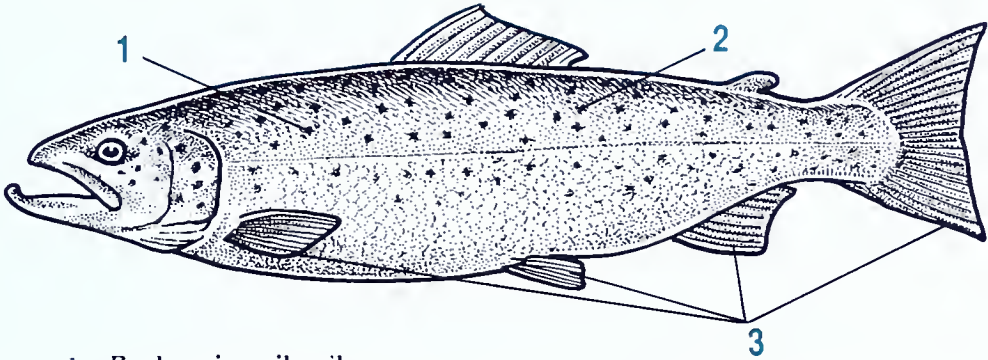
Figure 24 - **Kokanee Salmon**



1. Body color usually silverish blue, except during mating season when the males become brilliant red.
2. No distinct spots on back or tail.
3. Slightly smaller in size compared to other salmon.

The **Atlantic salmon** (*Salmo salar*) is closely related to the brown trout and much resembles a sea-run brown trout. The back may be brown, green, or bluish, and the sides silvery. Small, scattered x-shaped dark spots mark the back and upper sides. This species has been introduced to only a few Pennsylvania lakes. Individuals in these landlocked populations average smaller than their sea-run counterparts.

Figure 25 - **Landlocked Atlantic Salmon**

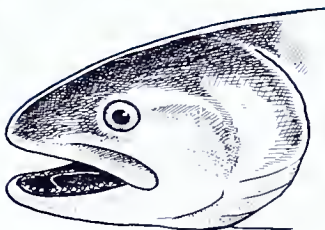


1. Body primarily silver.
2. Small X-shaped spots cover the upper sides and back.
3. No spots on fins or tail.

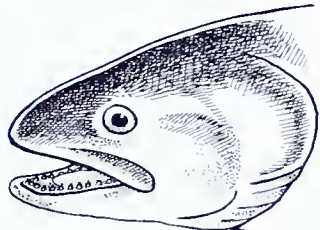
Figure 26 - **Mouths of Salmon Vs. Steelhead**



Coho - Black mouth with gray-white gums



Chinook - Black mouth and gums



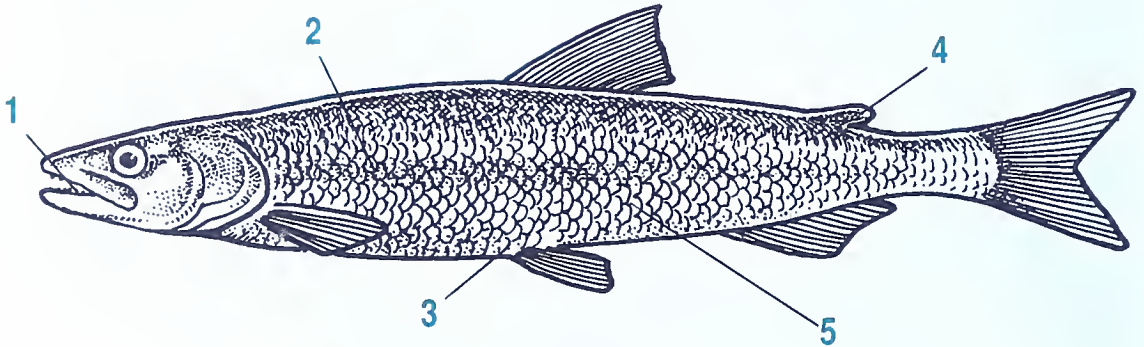
Steelhead - White mouth and gums

THE SMELTS

(Family Osmeridae)

The **rainbow smelt** (*Osmerus mordax*) is the only one among 10 species in this Northern Hemisphere family that is found in Pennsylvania. Like the trouts, salmon, and catfishes, the smelt has an adipose fin, but it lacks the axillary process of trouts and salmon and its silvery scales are large. The large mouth is well equipped with strong teeth.

Figure 27 - **Rainbow Smelt**



1. Mouth with obvious sharp teeth.
2. Back greenish to black; sides silvery with rainbow-like reflections.
3. No axillary process at base of pelvic fins.
4. Adipose fin present.
5. Slender body.

Smelt are spring spawners, moving from lake or ocean waters into tributary streams in large numbers. The adhesive eggs are broadcast over clean areas of the stream bottom in quantities sufficient to cover the bottom completely. Spawning may also take place in the shallow water of lakes.

Adult smelt frequent the middle depths of lakes in large schools and are utilized as forage by game fishes frequenting these depths. Anglers harvest large numbers of spawning adults with dip nets and take others during ice fishing season.

The rainbow smelt (*Osmerus mordax*) is a small species, averaging seven to eight inches. The back of this slender fish is pale greenish, but may become black in landlocked specimens. The sides are silvery with pink to blue-purple reflections that may dull in males during the spawning period. Spawning males also develop small, sharp tubercles that are well defined on the head and body.

THE PIKES

(Family Esocidae)

This family consists of five species distributed around the Northern Hemisphere. Importation of Amur pike eggs from Siberia and subsequent introductions of fry and fingerlings to Pennsylvania waters added the fifth species to the four already occurring here. As a result, Pennsylvania claimed the distinction of being the only place in the world where all the members of the pike family could be found. Although this apparently is still true, the Commission experienced a loss of original purebred Amur pike breeding stock during Hurricane Agnes flooding. This, coupled with the dilution of the stocks through hybridization, make questionable the number of purebred Amur pike in Pennsylvania.

The smallest species is represented by two subspecies. All members of this family are characterized by having a duck-bill snout and a single dorsal fin placed far back and above the anal fin near the forked tail.

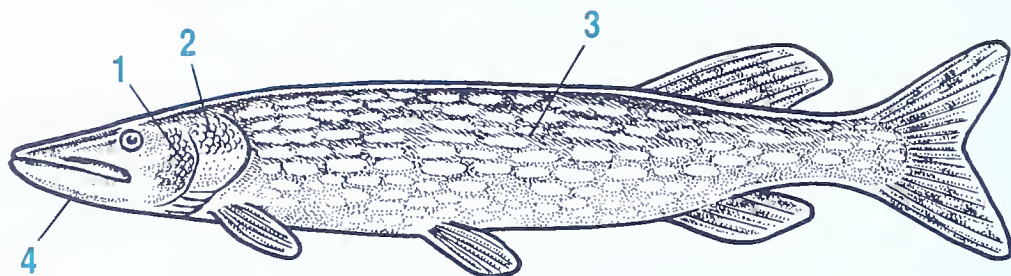
All of the pikes are spring spawners. One or more males may accompany a female to fertilize the eggs she broadcasts over live or dead vegetation in the shallows of streams or lakes. Eggs and young alike receive no parental care.

The diet of the young and adult pike includes a variety of live invertebrates and vertebrates. The redfin pickerel feeds heavily on invertebrates as an adult. The adults of the larger species, however, feed more on the vertebrates that share their aquatic environment such as fishes and mammals or birds. Despite its fearsome reputation, the muskellunge does not "eat itself out of house and home". Rather, its populations are relatively small and are kept healthy and in check by an equally healthy, diverse and abundant prey base maintained by its own predatory habits.

The great size attained by some of the species, along with the legends and mystique surrounding them, have attracted a select group of anglers. Other, smaller species enliven the angling experience for stream and lake fishermen throughout the year, but particularly for ice fishing devotees in some parts of the Commonwealth.

The **northern pike** (*Esox lucius*) may reach a length of 40 inches or so in Pennsylvania and a weight of 20 pounds. The back and sides range from a dark to light yellow green or gray green shading to a whitish belly. The tips of most body scales are golden, lending a golden-flecked appearance. The sides are conspicuously marked with rows of whitish-yellow bean-shaped spots, and the dorsal, caudal, and anal fins range from yellow green to orange red with large black streaks or spots.

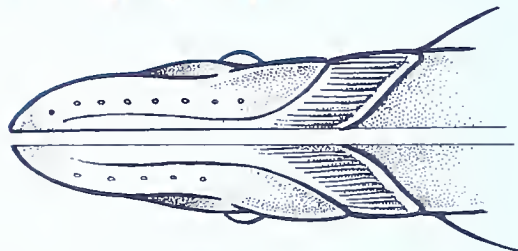
Figure 28 - **Northern Pike**



1. Cheek fully scaled.
2. Upper half of gill cover scaled.
3. Yellow-green or grayish-green back and sides with yellow bean-like spots.
4. Five pores on each side of lower jaw (see Figure 29).

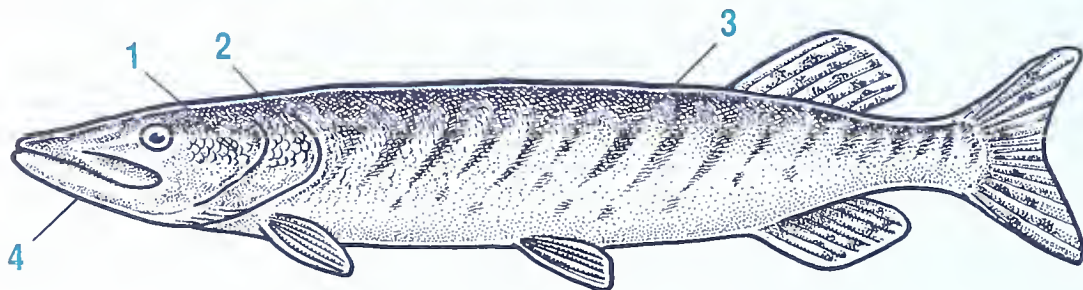
Figure 29 - **Underside of Jaw,
Muskellunge Vs. Northern Pike**

1. **Muskellunge** - 6 to 9 pores
2. **Northern Pike** - 5 pores



The **muskellunge** (*Esox masquinongy*) is our third largest fish, reaching a length of 50 inches or so, and a weight of 40-plus pounds. The back is a rich yellow green to brown; these colors become lighter on the sides, which may be somewhat silvery. Variable rows of indistinct dark spots or obliquely vertical bars often are present. The belly is whitish, and the fins are greenish buff to orange brown with dark blotches.

Figure 30 - **Muskellunge**



1. Upper half of cheek scaled.
2. Upper half of gill cover scaled.
3. Usually yellow green to brown over the back becoming lighter on the sides with light vertical bars.
4. Six to nine pores on each side of lower jaw (see Figure 29).

The **tiger muskellunge** is a hybrid derived from crossing the muskellunge and northern pike. The vertical bars on the sides are more prominent and regular than those of the muskellunge. Scale placement on the cheeks and gill covers is variable. The dorsal, caudal and anal fins are spotted or streaked with black. The ultimate size and weight attained fall somewhere between those of its parents.

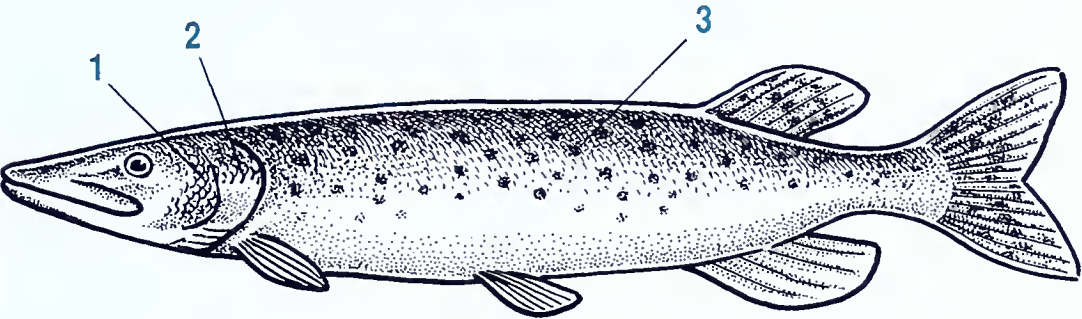
Figure 31 - **Tiger Muskellunge**



- 1. Cheek sometimes fully scaled.
- 2. Upper half of gill cover sometimes scaled.
- 3. Vertical dark gray-green bars about equal in width to light bars separating them.

The **Amur pike** (*Esox reicherti*) is closely related to the northern pike, reaching about the same maximum size. Dark brown to black “polka-dots” on a silvery background make its identification easy.

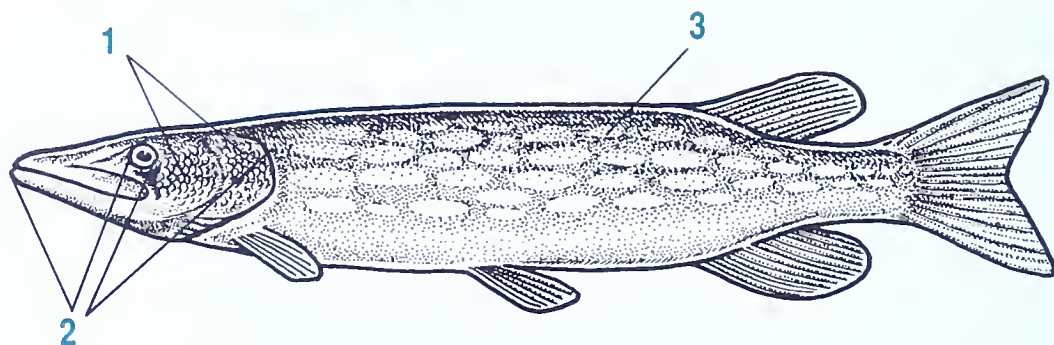
Figure 32 - **Amur Pike**



- 1. Cheek fully scaled.
- 2. Upper half of gill cover scaled.
- 3. Dark back, light sides with large dark spots.

The **chain pickerel** (*Esox niger*) may reach a length of more than 30 inches, but most large individuals taken are between 20 and 30 inches. The back is dark greenish yellow, shading to lighter yellow green on the sides. A network of dark “chain-like” markings pattern the sides and a dark “tear” mark is usually found under each eye. The fins are pale and unmarked.

Figure 33 - **Chain Pickerel**



1. Entire cheek and gill cover scaled.
2. Distance tip of snout to front of eye, greater than distance from back of eye to end of gill.
3. Dark greenish-yellow back and yellow-green sides with dark chain-like pattern.

The **redfin pickerel**, represented by two subspecies, *Esox americanus americanus* (redfin pickerel) and *Esox americanus vermiculatus* (grass pickerel), seldom attains lengths of more than 12 inches. The black "tear" mark is usually present below each eye and faint, oblique bars or spots may be present on the sides. In Pennsylvania, the redfin pickerel is found east of the Allegheny mountains and the grass pickerel west of these mountains.

THE MINNOWS

(Family Cyprinidae)

This large family of fishes is represented in Pennsylvania by nearly 40 species, thus making up nearly 25 percent of our total fish fauna. As might be expected, correct identification of species is most difficult without the use of some technical characteristics. Nonetheless, the species we have chosen are widespread and common and should be identified with relative ease. The various species range in size from 30 inches (carp) to less than 3 inches (bridle shiner). Many of the species are similar in size and appearance, and all have a single, soft-rayed dorsal fin. Several rows of hard teeth, or tooth-like structures, are found on the fifth (or hindmost) gill (pharyngeal) arches.

Spawning males of many species develop hard, pointed tubercles (pearl organs) on the head, body, or fins along with heightened colors or swelling of the head or other body areas.

While many species spawn during the spring to early summer period, others spawn in mid- to late summer. While most build no nest, some species are well-known for the stone mounds the males create in streams. Since a number of other species may then move in to utilize these mound

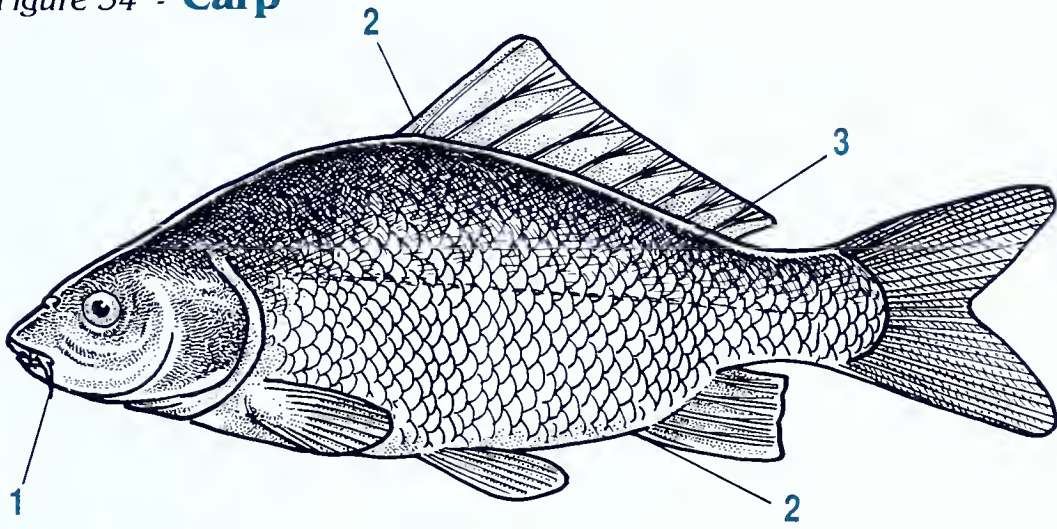
nests for spawning, natural hybrids of several species have been recorded.

Aside from the carp, which is large enough to provide food and sport, most of the species are valued as bait for various game fishes. Many may prey on gamefish eggs or fry, but provide forage for these larger species in return.

A number of the species are valuable indicators of prevailing water quality conditions. Some species are either considered endangered or are candidates for endangered or threatened status. Overall, the members of this family are an important component of our fish fauna.

The **common carp** (*Cyprinus carpio*) needs little introduction to most anglers. It is often confused with goldfish that might be found in the wild, but attains a much greater size. It also has two pairs of fleshy barbels around the mouth that the goldfish does not have. Like the goldfish, the dorsal and anal fins have a sharp spine. The back is olive brown, becoming silvery bronze on the sides above the yellowish belly. The caudal and anal fins may be tinged with reddish. Occasional individuals may have only large and scattered scales ("mirror carp") or no scales ("leather carp").

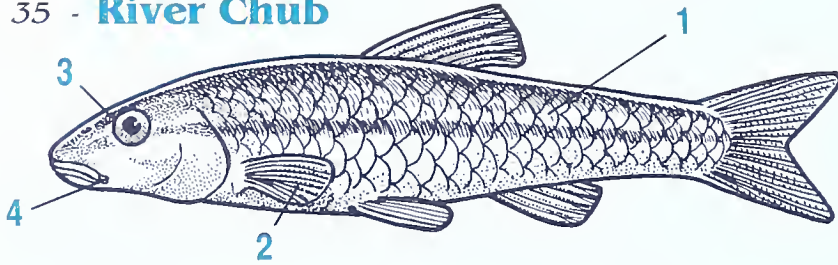
Figure 34 - **Carp**



- 1. Two pairs of barbels in region of mouth.
- 2. Toothed spines on leading edge of dorsal and anal fins.
- 3. Olive-brown to reddish-brown back, silvery-bronze sides with yellowish belly.

The **river chub** (*Nocomis micropogon*) attains lengths of six to nine inches. The back is olive brown, shading to silvery on the sides above the pale yellowish belly. The head of large breeding males becomes swollen on top between and behind the eyes. The head has fewer than 40 large, sharp tubercles (pearl organs) above the snout but below the eyes. The pectoral fins are somewhat rounded and blunt-tipped and a fleshy barbel is present at the rear angle of the jaws.

Figure 35 - **River Chub**



1. Back olive brown, sides silvery with yellowish belly.
2. Pectoral fin blunt-tipped and rounded.
3. Eye located high on head, halfway between tip of snout and back edge of gill flap.
4. Fleshy barbel to rear of jaw.

The **golden shiner** (*Notemigonus crysoleucas*) is a deep-bodied minnow with a relatively small head that attains a length of 10 inches or so. The back is olive brown, shading to a brassy-silver color on the sides. Those smaller than four inches are more silvery with a dark band along the middle of each side. The belly between the pelvic and anal fins is raised in a sharp ridge or keel that bears no scales. The lateral line is curved noticeably downward.

Figure 36 - **Golden Shiner**

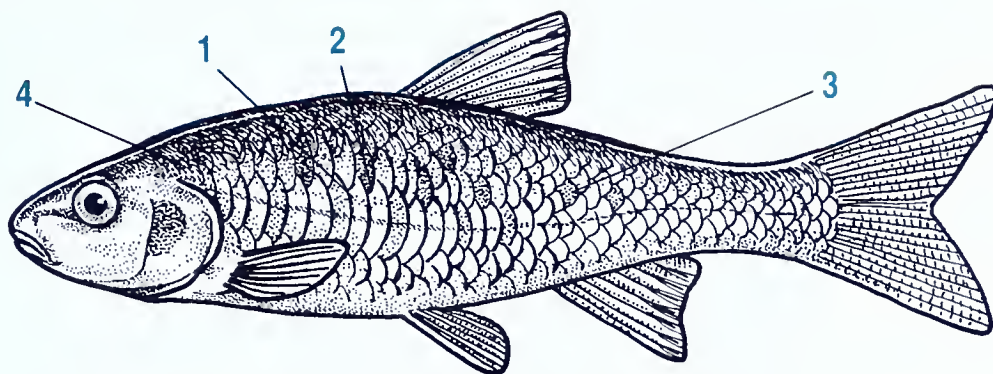


1. Head relatively small compared to depth of body.
2. Lateral line curves downward.
3. Back olive brown, shading to brassy silver on sides.
4. Sharp, scaleless keel on belly between pelvic and anal fins.

The **common shiner** (*Notropis cornutus*) averages three to four inches in length, but may attain eight inches. The back is olive green with a noticeable purple or blue-gray stripe, becoming silvery on the sides and white on the belly.

The head of breeding males becomes swollen and pinkish purple and is marked with a dense covering of sharp tubercles (pearl organs) that extend along the back to the dorsal fin; a single row of tubercles also is found along the hind corners of the lower jaw. The scales on each side are higher than they are wide. Their pigmentation makes it appear as though some scales are missing. The scales on the back just behind the head are small and crowded in irregular rows.

Figure 37 - **Common Shiner**

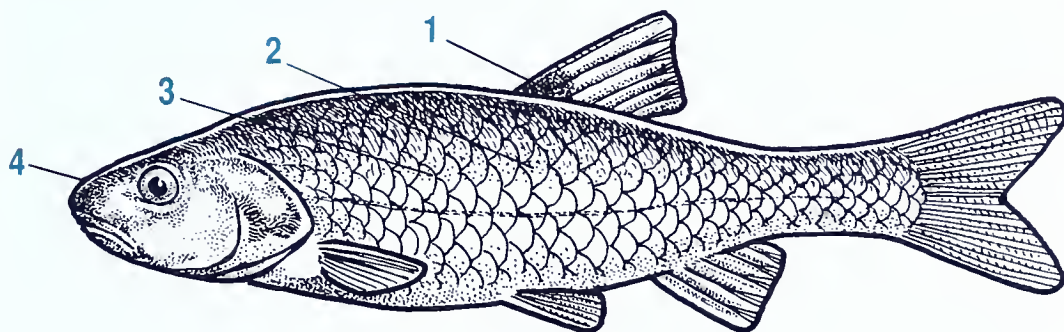


1. Olive-green back, silvery sides and white belly.
2. Back has lengthwise purple or blue-green stripe.
3. Side scales are higher than they are wide, and some may appear to be missing.
4. Scales on the back just behind the head are small and crowded.

The **creek chub** (*Semotilus atromaculatus*) may attain a length of 10 inches, but averages closer to four inches. The back is light to dark olive, shading to silvery on the sides with purple-violet reflections above the silvery-white belly. The dorsal fin has a dark spot at the lower front corner. The head and body of breeding males are tinged with rose purple, blue, yellow or orange. A single row of six to 12 large tubercles extends backward from the front of the snout to a point above and just behind each eye; smaller tubercles are found on the gill cover and the first six to eight rays of the pectoral fins.

The young are more silvery but have the spot on the dorsal fin. A narrow black band extends along the middle of each side from the eye to the caudal fin base; it ends in a dark spot.

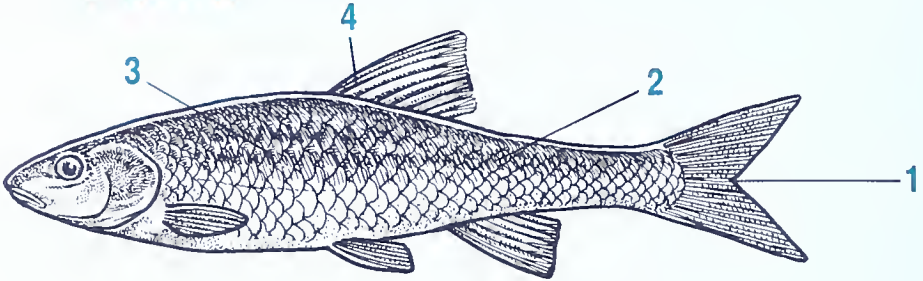
Figure 38 - **Creek Chub**



1. Dark spot at front corner of dorsal fin.
2. Back light to dark olive; silvery sides and silvery-white belly.
3. Purple to violet reflections often seen on sides.
4. In breeding males only, row of tubercles extends backward from front of snout.

The **fallfish** (*Semotilus corporalis*) may attain lengths of over 12 inches, but averages half that. The back is olive brown to black, shading to silvery on the sides; the belly is white. The side scales in adults are marked with a dark triangular bar at the front corners, and are thus outlined. Fallfish less than four inches are silvery with a prominent wide dark band extending along the middle of each side. This band extends from the eye to the base of the caudal fin where it ends in a large dark spot. The caudal fin is forked with sharp-pointed lobes.

Figure 39 - **Fallfish**



1. Tail forked with sharp-pointed lobes.
2. Side scales with dark, triangular bars.
3. Back olive brown to black; sides silvery.
4. No dark spot in dorsal fin.

THE SUCKERS

(Family Catostomidae)

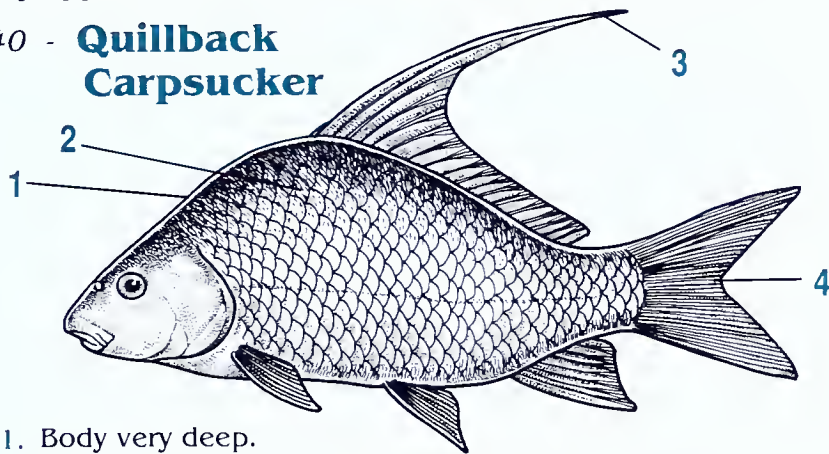
Eighteen species of this family are recorded for Pennsylvania, but it is questionable whether six of these still remain. The **longnose sucker** (*Catostomus catostomus*) is an endangered species. The suckers are characterized by having a single soft-rayed dorsal fin, a single row of more than 16 pharyngeal teeth, and an anal fin placed farther back on the belly than it is on the minnows. The mouth is directed downward and is circled with thick, fleshy lips. All the suckers are robust and of moderate size.

Nearly all of the species are stream dwellers, but the white sucker and the chubsuckers can also be found in lakes. Spawning occurs in the spring following mass migrations into tributary streams or to in-stream riffles. The young feed on zooplankton and algae, and since they provide forage for game fishes are used as bait. The adults feed on a variety of invertebrates including mollusks. Although bony, all are considered edible, and some provide an important early season fishery.

The **quillback** (*Carpionodes cyprinus*) is the only one of three species of carpsuckers originally recorded in Pennsylvania that is still known to reside here. The body is deep and compressed from side to side. The back is light brown, shading to silver on the sides above a pale belly. This spe-

cies lacks the nipple-like projection on the front edge of the lower lip found in other species. Carpsucker is a good common name for these fishes, since they appear to be a combination of carp and sucker.

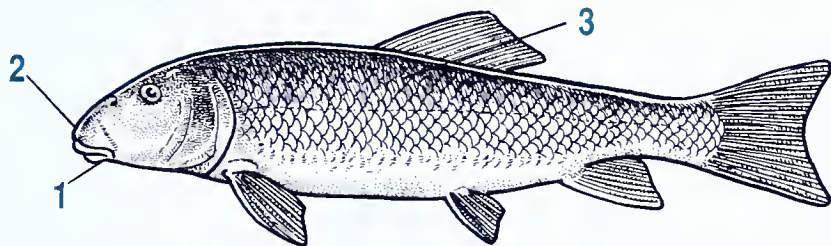
Figure 40 - **Quillback Carpsucker**



1. Body very deep.
2. Back light brown with sides mostly silvery.
3. Single dorsal fin with elongated rays in front portion.
4. Tail deeply forked.

The **white sucker** (*Catostomus commersoni*) is the most common and widespread of our suckers. Maximum lengths of up to 24 inches and relative ease of capture make this species a particular favorite of early spring anglers. The upper portion of the head and back are brown of varying hues, shading to pale yellowish with dull silvery reflections above the whitish belly. The lower lip is wider than high and completely split into two parts. The snout barely extends beyond the upper lip.

Figure 41 - **White Sucker**

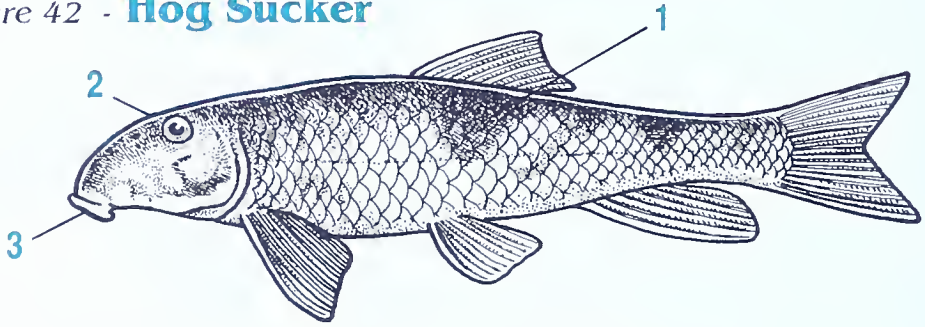


1. Lower lip wider than high and split into two parts if viewed from below.
2. Snout barely extends beyond upper jaw.
3. Back various shades of brown; sides pale yellowish with silvery reflections.

The **hog sucker** (*Hypentelium nigricans*) may attain a length of 10 to 12 inches. The back and upper part of the head are brown with darker mottlings. These dark marks on the back form saddles which shade to a lighter brown having a dull bronzy sheen. Darker mottlings cover the sides above the whitish belly. The top of the head between the eyes is noticeably depressed and the snout is very long. The fleshy lips surrounding the

mouth are prominent and not as easily drawn back as on our other suckers.

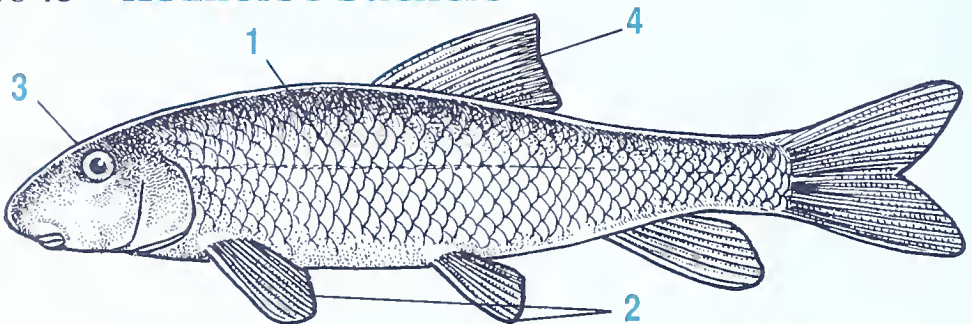
Figure 42 - **Hog Sucker**



1. Back and sides brown with dark mottling.
2. Top of head between eyes appears "caved in".
3. Prominent, barely retractable lips.

Five species of **redhorse suckers** (genus *Moxostoma*) are presently known to inhabit Pennsylvania waters. The **river redhorse** (*M. carinatum*) is a candidate for threatened or endangered status. A total of 18 species make up the genus which is limited to North and Central America. Although some of the species may exceed 24 inches, most reach lengths of 12 to 20 inches. Many of the species are similar in appearance, with gray-brown to olive-brown backs and upper sides accented with coppery, golden or greenish reflections. The color becomes golden or silvery bronze on the lower sides. The belly is golden or a silvery white. The fins are variously tinged with pinkish orange to red orange, edged with white or olive gray in some species. Differences in the shape and degree of folding of the fleshy lips are most useful in separating the individual species. Differences in the number of scale rows on various areas of the body also help sort the species. If the average angler has difficulty identifying the various species, he's not alone. The group is difficult even for fishery biologists to sort.

Figure 43 - **Redhorse Suckers**



1. Gray-brown to olive-brown back and upper sides; greenish to coppery reflections on sides; lower sides silvery or bronze; belly silvery white.
2. Fins tinged with pinkish to reddish orange; may be edged with white or olive gray.
3. Head between the eyes is convex.
4. Dorsal fin has 10 to 17 rays.

THE CATFISHES

(Family Ictaluridae)

Known technically as the bullhead catfishes, this family is represented by 13 species in Pennsylvania. Nearly half of the species belong to the genus *Noturus*, and these are small in size, generally secretive and often rare or sporadically distributed. Several species are considered threatened. All have well-developed pectoral spines connected to poison glands. Members of this genus also have an adipose fin that directly joins the tail fin.

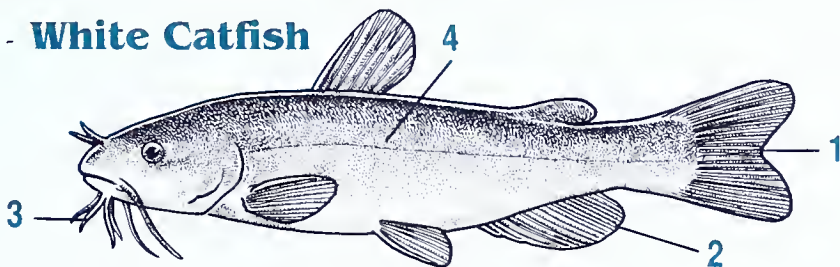
The remaining species of the catfish family range in size from 17 to 45 inches maximum length and from several to 150 pounds in weight. They also possess variously-developed pectoral spines with associated poison glands, but the adipose fin is free and not connected to the tail fin. All species possess eight flashy head appendages known as barbels or "whiskers" and a well-developed spine in the dorsal fin.

As far as is known, spawning takes place from spring to early summer. Males of the larger species excavate a hollow nest, while the smaller species utilize the spaces found under rocks or other underwater objects. Females are stimulated to lay a mass of sticky eggs when clasped by the male, and one or both parents, often the male, then guard the eggs and shepherd the fry.

Many of the larger species have been widely cultured for recreational and commercial use, since they provide an important angling experience for many people and are excellent eating. While the smaller species can be eaten, they are seldom encountered or used for this purpose. A few of them are sometimes used by anglers as bait for other fishes. Their chief value may be their use as natural forage or as indicators of water quality.

The **white catfish** (*Ictalurus catus*) may attain a length of 24 inches. The back and upper sides are light blue gray to slate gray, shading to pure silvery white on the belly. The chin barbels are also whitish. Though the caudal fin is somewhat forked, the lobes are not sharply pointed. The head is very broad and the pectoral fin spines are strongly toothed on the hind margin. The anal fin has 25 or fewer rays.

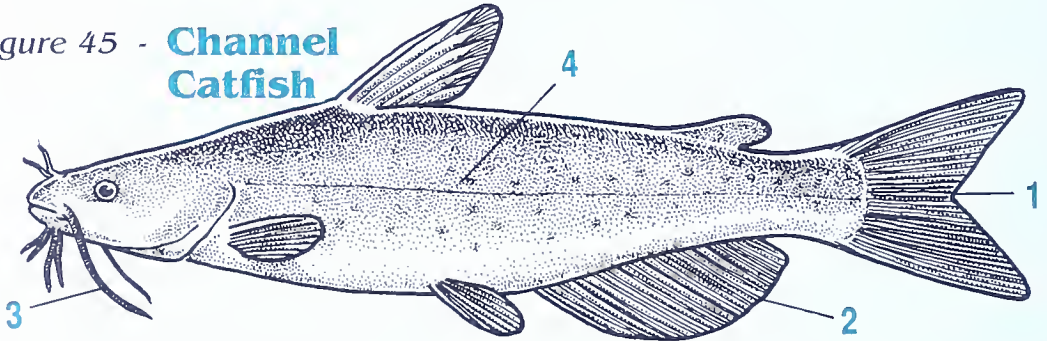
Figure 44 - **White Catfish**



1. Tail is forked (see Figure 48).
2. Anal fin has 25 or fewer rays.
3. Chin barbels whitish.
4. Bluish gray to slate gray on back and upper sides, becoming silvery; belly is silvery white.

The **channel catfish** (*Ictalurus punctatus*) attains lengths exceeding 24 inches and reaches weights of 15 pounds or more. The upper portion of the head, back and sides are blue gray to slate gray, shading to whitish on the belly. Individuals less than 15 inches are marked along the sides with a number of small, black spots. Large individuals become darker and lose the spotting; this is particularly true of males. The chin barbels are dark for most of their length. The caudal fin is noticeably forked, and except in older individuals, the lobes are sharp-pointed. The pectoral fin spines are strongly toothed on the hind margin. The anal fin has 24 to 30 rays.

Figure 45 - **Channel Catfish**



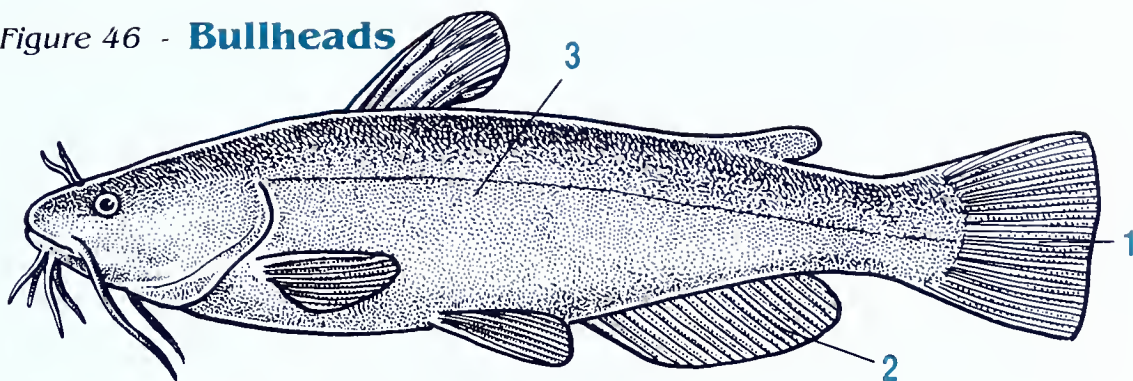
1. Tail deeply forked, lobes pointed (see Figure 48).
2. Anal fin has more than 24 to 30 rays.
3. Chin barbels blackish.
4. Bluish back and sides, whitish below; small, irregular black spots.

The **brown bullhead** (*Ictalurus nebulosus*) attains maximum lengths of 17 to 18 inches. The upper part of the head, back and sides are dark to light yellow brown or olive brown, shading to whitish or pale yellow on the belly. Light brown blotches may be evident along the sides. The chin barbels are dark, though sometimes whitish at their base. The caudal fin is square-tipped, and the pectoral fin spines are strongly toothed on the hind margin. The anal fin has 22 or 23 rays.

The **black bullhead** (*Ictalurus melas*) is very uncommon in Pennsylvania and recorded only from the western edge and northwestern corner of the state. It may attain a length of 18 inches, but usually averages much smaller. The upper part of the head, back and sides are dark brown, olive brown or black, shading to a greenish gold sheen along the sides. The belly is yellowish white. A bar of lighter color extends along the base of the tail. The chin barbels are dark or dark-spotted, and the fin membranes are very dark, contrasting with the lighter rays. The caudal fin is square-tipped, and the pectoral fin spines are weakly toothed on the hind margin. The anal fin usually has 18 to 20 rays.

The **yellow bullhead** (*Ictalurus natalis*) may grow to 18 inches, but usually averages smaller. The upper head, back and upper sides are light to dark olive brown or yellow brown, shading to yellow along the sides. The belly is yellow or whitish. The chin barbels are pale. A rounded tail sets this species apart, but the pectoral fin spines are strongly toothed on the hind margin as in some other species. The anal fin has more than 24 rays.

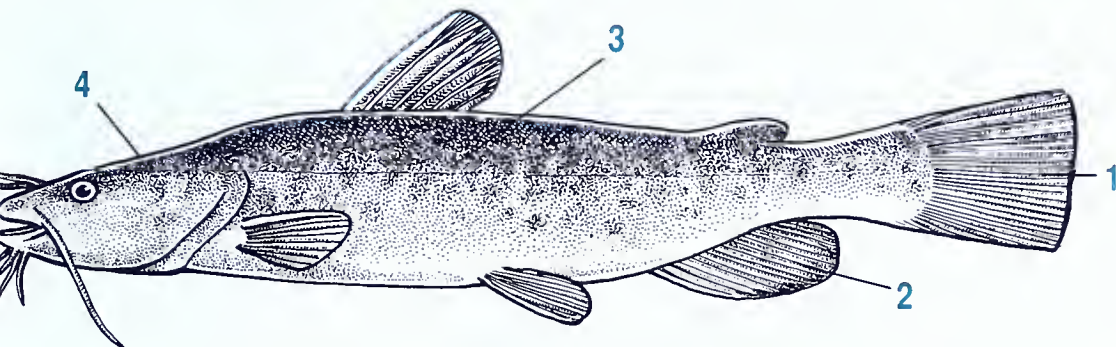
Figure 46 - **Bullheads**



1. Tail straight or slightly rounded (see Figure 48).
2. Anal fin has 18 to more than 24 rays.
3. Coloration varies between brownish, black and olive to yellowish.

The **flathead catfish** (*Pylodictis olivaris*) attains lengths greater than any of our catfishes, and while known to exceed 100 pounds elsewhere, may more commonly reach 20 to 30 pounds in Pennsylvania. The upper portion of the body is light to dark brown with a darker mottling, shading to lighter brown above the grayish belly. The head is wide and very depressed, and the tail is square to slightly indented. In Pennsylvania, this solitary catfish may be found occasionally in some of the large streams or lakes of the lower portion of the Ohio River drainage only.

Figure 47 - **Flathead Catfish**



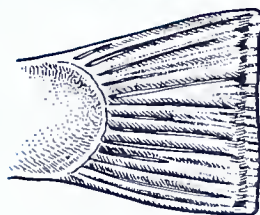
1. Tail square or slightly indented (see Figure 48) .
2. Anal fin less than 16 rays.
3. Yellowish brown to dark brown above, pale gray below; mottled sides.
4. Head wide and flattened.

Figure 48 - **Comparison of Tails of Catfish Family**

Channel catfish
White catfish



Flathead catfish
Bullhead catfish



THE TEMPERATE BASSES

(Family Percichthyidae)

Three species represent this family in Pennsylvania-the white perch, white bass, and striped bass or rockfish. All have a spine on the outer rear portion of the gill cover (opercle). Also, a conspicuous patch of gill-like, secretion-emitting tissue is found on the under surface of the gill cover. These characteristics are also shared by the white bass/striped bass hybrid produced in the hatchery.

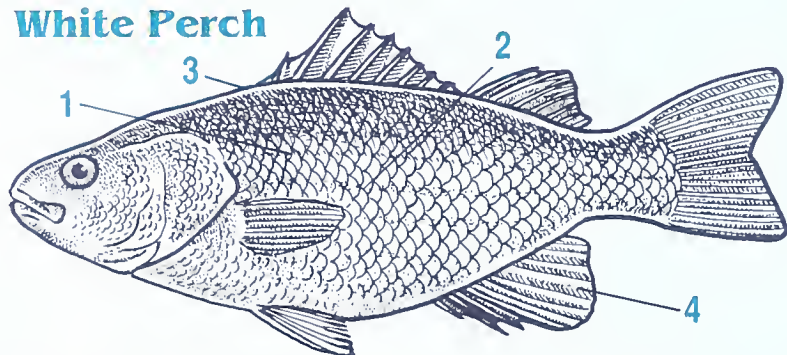
All of the species are schooling fishes, often following and feeding upon the schools of alewife, gizzard shad or smelt that move from mid-water depths during the day to depths just below the surface at night.

Spawning is also a communal affair as large numbers move from saline or brackish water areas or impoundments into streams or shoal waters in the spring. While the eggs of the white perch and white bass adhere to vegetation or bottom rubble, those of the striped bass are semi-buoyant and drift downstream.

Although all provide both sport and commercial fisheries, the striped bass sport fishery is significant. Striped bass are known to reach lengths of 42 inches and weights of 43 pounds in Pennsylvania and 100 pounds elsewhere. White perch and white bass may reach 15 to 17 inches and weights of several pounds. The white bass and striped bass hybrid is a fast-growing, scrappy fish reaching lengths and weights somewhere between those of its parents.

The **white perch** (*Morone americana*) is the least marked of our species in the genus *Morone*. The back may be dark olivaceous, gray green, silvery gray or brownish black, shading to pale silvery green on the sides. The belly is silvery white. The apparently separate dorsal fins actually are joined by a membrane. This species has eight to 10 rays behind the three spines in the anal fin; the second and third spines are of nearly equal length. Like the white bass and striped bass, a single spine makes up the leading edge of the soft-rayed dorsal fin.

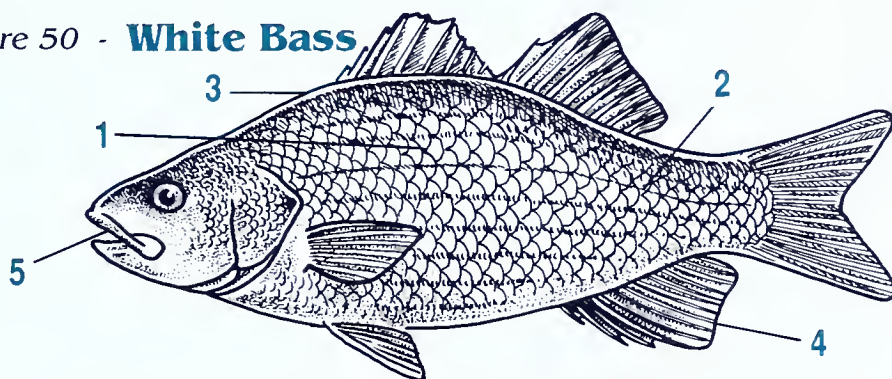
Figure 49 - **White Perch**



1. Back is dark; sides silvery green; belly silvery white.
2. Sides unmarked except for possibly very faint streaks.
3. High-backed body arched more than white bass.
4. Anal fin with 8 to 10 soft rays.

The **white bass** (*Morone chrysops*) is somewhat less robust than the white perch. The back may be dark gray or green, shading to silvery on the sides above a white belly. The sides are marked with five to seven often broken, horizontal dark stripes. Unlike the white perch, which has a thin band of teeth around the tongue's front margin, this species has a single patch on the front surface of the tongue. The anal fin consists of three spines and 12 to 13 soft rays. The dorsal fins are not connected by a membrane.

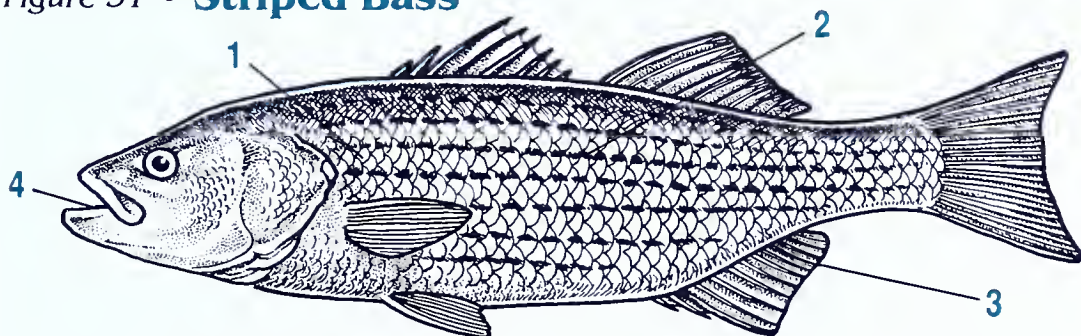
Figure 50 - **White Bass**



1. Back dark; sides silvery with white belly.
2. Relative lack of stripes; only one reaches gill to tail.
3. Body deeper, back more arched than the striped bass.
4. Anal fin with 12 or 13 rays, three of them spinous.
5. One tooth patch on front of tongue (see Figure 53).

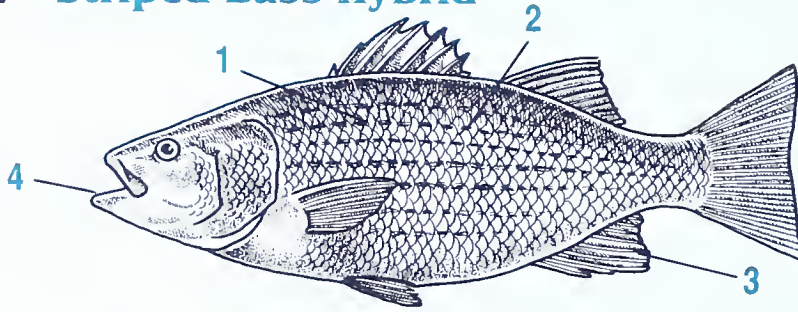
The **striped bass** (*Morone saxatilis*) is somewhat similar to the white bass, but is less robust. The back is dark olive green, silver blue or black, shading to silvery, or sometimes brassy, on the sides. The belly is white. A fairly regular, though somewhat interrupted, series of seven to eight horizontal dark stripes run along the sides. The tongue bears an elongated pair of tooth patches along the sides. Three spines and nine to 11 soft rays make up the anal fin. The longest spine is less than half the height of the anal fin. The dorsal fins are entirely separate.

Figure 51 - **Striped Bass**



1. Seven or eight black stripes, heavy and distinct, run length of body. Stripes unbroken from gill to tail.
2. Back olivaceous to blue or black; sides silvery, shading to white belly.
3. Anal fin with 9 to 11 rays.
4. Tongue with two tooth patches, one along each side (see Figure 53).

Figure 52 - **Striped Bass Hybrid**



1. Seven or eight black stripes; usually less distinct than pure striped bass. Stripes often broken between gills and tail.
2. Back dark, almost black; silvery sides and white belly.
3. Anal fin has 11 or 12 rays.
4. Two tooth patches on rear of tongue (see Figure 53).

Figure 53 - **Tooth Patches on Tongue**

1. Tongue
2. One tooth patch
3. Two tooth patches



THE SUNFISHES

(Family Centrarchidae)

Seventeen species of this predominately eastern North American family have been recorded in Pennsylvania. Several are quite rare, while others are no longer found here. All have a single dorsal fin consisting of both spiny and soft rays, and there are three or more spines in the anal fin. They lack a spine on the gill cover. Despite the fact that three other families of Pennsylvania fishes have an equal or larger number of species, the members of this family seem familiar to more anglers. While many people apply the term "sunfish" to the smaller species of the family, the crappies and largemouth and smallmouth basses are also sunfishes.

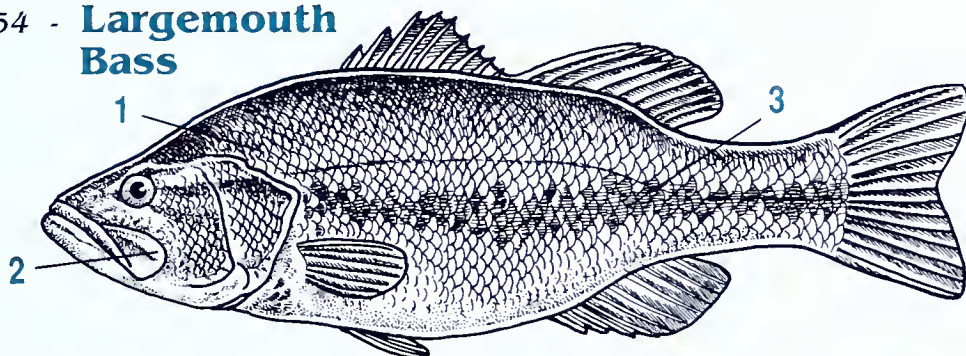
Depending on the species, spawning takes place from spring through summer when males clear an area of the bottom of stream and lake shallows for several nests. The males defend these nests to prevent their use by others of the same or other species. One or more females are courted and spawning follows. After the eggs are deposited and fertilized, the females are driven off. The eggs are protected, and using his pectoral fins, the male keeps a current of water moving over and around the eggs. Whether the nests are somewhat separated or quite close together, the males are kept busy protecting and aerating the eggs. Even after the eggs hatch, the males continue to guard and shepherd the fry.

There probably are few anglers who have not caught one or more members of this family, even when not fishing especially for them. Not only are

they good eating, but their recreational value is so great that some of the species have been introduced into other parts of the world.

The **largemouth bass** (*Micropterus salmoides*) attains lengths up to 26 inches, making it our largest sunfish. The head and back are bright green to olive, shading to a lighter green or gold green on the sides. The belly is white or pale yellow. The eye is brownish. Younger individuals have a noticeable black band along the middle of each side that becomes more broken and indistinct in older individuals. Although they may appear to be separated, the spinous and soft-rayed portions of the dorsal fin actually are joined together.

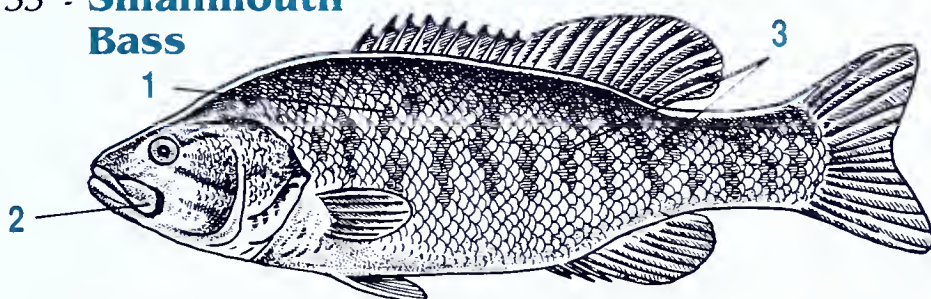
Figure 54 - **Largemouth Bass**



1. Head and back bright green to olive; sides lighter green; belly is white or pale yellow.
2. Upper jaw extends beyond eye (see Figure 56).
3. Broad black stripe usually runs along middle of side.

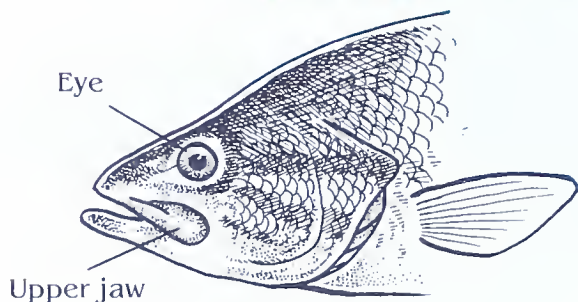
The **smallmouth bass** (*Micropterus dolomieu*) could reach 24 inches. The upper part of the head and back may be brown, bronzish brown, greenish or olive, shading to lighter hues on the sides. There is a golden sheen above the white or pale yellow belly. Most of the scales along the sides are gold-flecked; some of these are darkened to form irregular spots that are variously connected to form thin vertical stripes. Dark stripes also radiate along the sides of the head from the eye and corner of the mouth. The eye is usually orange red.

Figure 55 - **Smallmouth Bass**

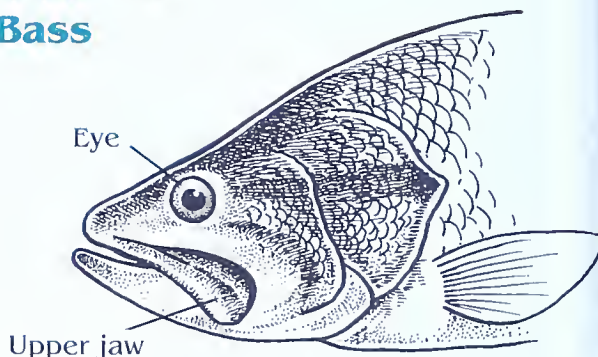


1. Back brown, greenish or olive, shading to lighter hues on sides; belly white or pale yellow.
2. Upper jaw does not extend beyond eye (see Figure 56).
3. Dark, vertical bars on side.

Figure 56 - **Jaws - Largemouth Bass
Vs. Smallmouth Bass**



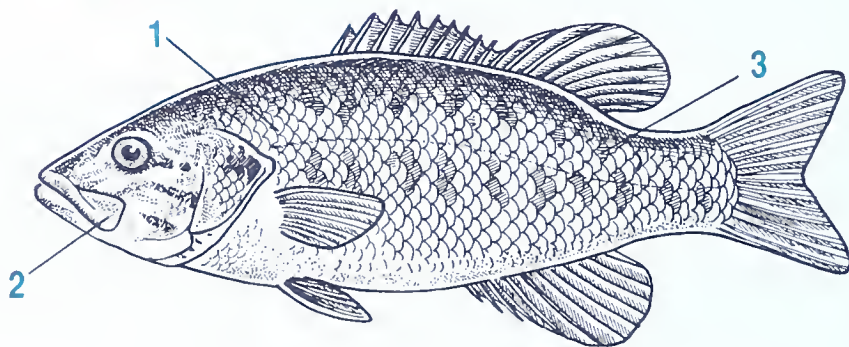
Smallmouth bass



Largemouth bass

The **spotted bass** (*Micropterus punctulatus*) is known to inhabit several locations in rivers of the lower Ohio River basin only. It attains a length of 17 inches. The upper portion of the head and back are dark to light olive green, shading to lighter silvery green on the sides above the whitish belly. A series of dark, somewhat diamond-shaped spots are seen above a dark band which runs along the middle of each side. Below this band the scales are regularly marked with dark spots which form rows.

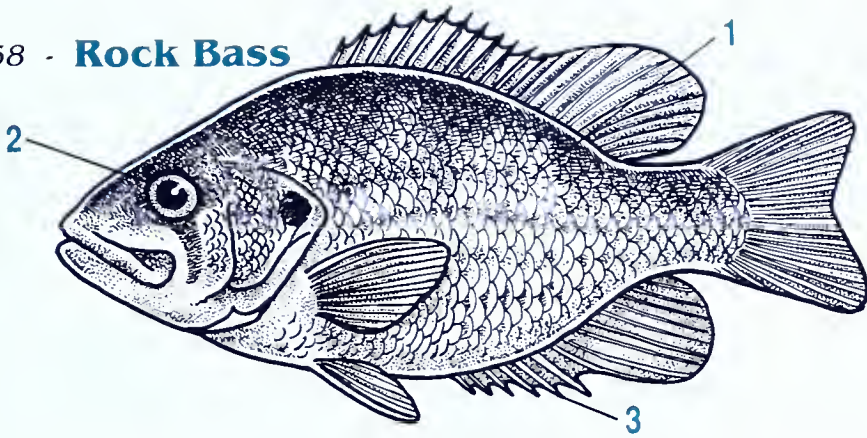
Figure 57 - **Spotted Bass**



1. Back olive green; silvery green sides with whitish belly.
2. Upper jaw usually extends as far backward as rear portion of eye.
3. Diamond-shaped spots above the lateral line.

The **rock bass** (*Ambloplites rupestris*) reaches a length of 12 inches. The upper part of the head, back, and sides are dark olive brown to golden brown, shading to lighter hues on the sides. The belly is whitish. Many of the side scales are marked with dark spots which form rows, and some scales are further darkened to form a mottling effect or vertical bars. The eye is bright red or orange, and the gill flap has a diffuse dark spot at the upper corner. This species is found in lakes and streams, but is most common in rivers and their larger tributaries.

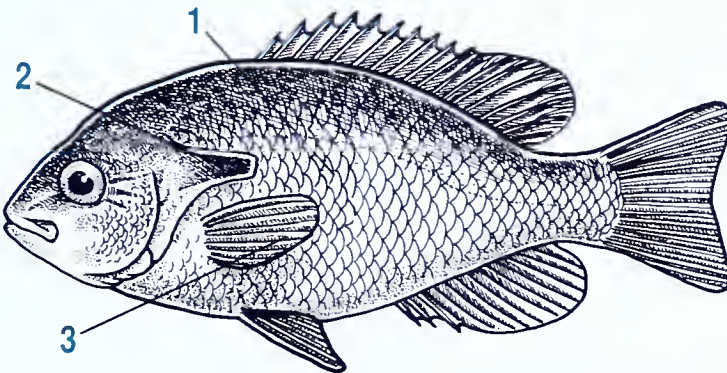
Figure 58 - **Rock Bass**



1. Back and upper sides olive brown to golden brown; sides lighter with dark mottling over white belly.
2. Eye bright red or orange.
3. Six spines on anal fin.

The **redbreast sunfish** (*Lepomis auritus*) may reach 12 inches, but like most of our smaller sunfishes, individuals up to eight inches are most commonly encountered. The upper part of the head, back and sides are dark olive to golden brown, shading to lighter hues on the sides. The belly is dusky. Diffuse reddish spots and blue streaks mark the sides, and the breast is yellow to red orange. A series of bluish streaks radiate along the sides of the head from the snout to the back edge of the gill cover. The long, flexible blue-black flap extending backward from the gill cover is not bordered with a lighter color. The species is found in streams and lakes, but is more common in larger streams and rivers.

Figure 59 - **Redbreast Sunfish**

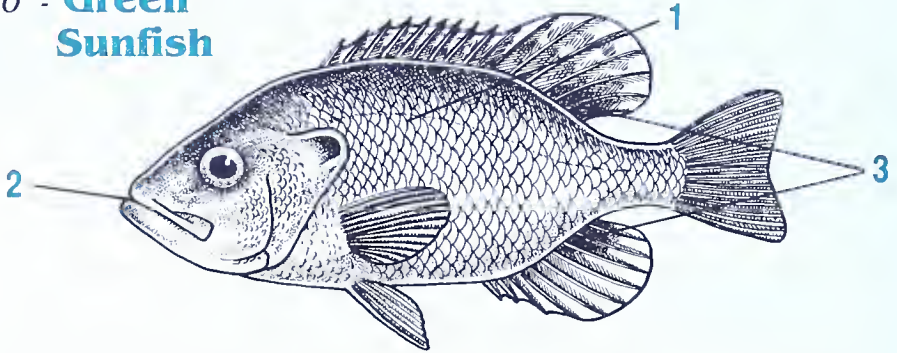


1. Back and sides dark olive to golden brown, sides lighter; belly is dusky.
2. Gill cover black, long and narrower than eye.
3. Pectoral fin short and rounded.

The **green sunfish** (*Lepomis cyanellus*) may reach nine inches. The upper part of the head, back and sides are dark olive to brown with a bluish sheen, shading to light greenish yellow on the sides. The belly is whitish

or pale yellow. A series of diffuse dark vertical bars accent the sides, and the head is marked with bright blue spots or radiating streaks. The somewhat short, stiff gill flap is black, edged with pale reddish, pink or yellow. A spot of dark pigment marks the rear base of the dorsal and anal fins.

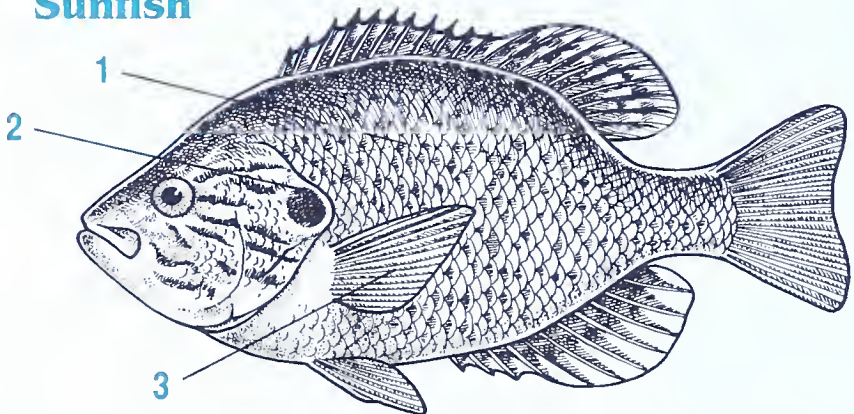
Figure 60 - **Green Sunfish**



1. Back and sides dark olive to brown with bluish sheen; sides greenish yellow; belly whitish or pale yellow.
2. Heavy lips and large mouth.
3. Black blotch on dorsal and anal fins.

The **pumpkinseed** (*Lepomis gibbosus*) may attain a length of 10 inches. The upper part of the head, back and sides are olive to golden brown, with a blue-green sheen shading to golden along the sides. Connected, irregular blue-green lines and spots of olive, orange or red range over the sides. The breast is bronze yellow to orange and the belly is whitish. Some side scales are darkened to form a few indistinct vertical bars, and a series of wavy, blue-green stripes mark the sides of the head. The short gill flap is flexible only at the tip. It is black with a narrow border of white, yellow, orange or blue. A prominent spot of bright red, orange or yellow accents the gill flap.

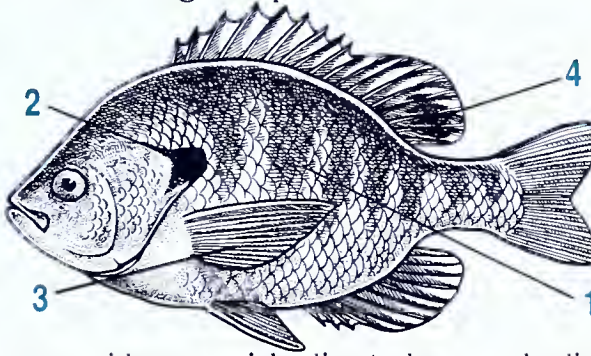
Figure 61 - **Pumpkinseed Sunfish**



1. Head, back and upper sides olive to golden brown, with blue-green sheen; sides are golden; breast is bronze yellow to orange; belly is whitish.
2. Gill flap black with bright red or orange tip.
3. Pectoral fin long and pointed.

The **bluegill** (*Lepomis macrochirus*) could reach 12 inches. The upper part of the head, back and sides are greenish olive to brown, shading to brownish, orange or pink. The breast is yellow or coppery orange and the belly is white. A series of indistinct vertical bands divide the sides. The sides of the head are greenish to blue green, becoming metallic blue in front of the plain black gill flap. The metallic blue continues around the lower edge of the cheek and gill cover. A prominent black spot is found on the rear, lower portion of the dorsal fin. Like the pumpkinseed, the bluegill's pectoral fin is long and pointed.

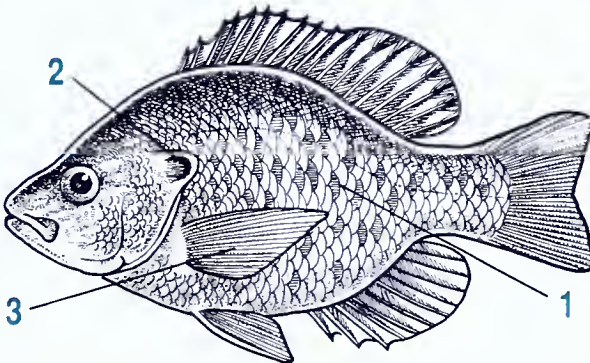
Figure 62 -
**Bluegill
Sunfish**



1. Back and upper sides greenish olive to brown, shading to brownish, orange or pink; breast yellow or coppery orange; white belly.
2. Broad black gill flap.
3. Pectoral fin long and pointed.
4. Black blotch on rear of dorsal fin.

The **redear sunfish** (*Lepomis microlophus*) may grow to about 12 inches. The upper part of the head, back and sides are dark olive green, shading to lighter olive on the sides. The sides are marked with darker olive spotting above a yellowish breast and belly. The short gill flap is black with a border of bright red or orange below and to the rear. The pectoral fin is long and pointed. The hindmost pair of gill arches bear molar-like pharyngeal teeth used for crushing snails. This species is found only in a few scattered lakes in the southern part of the state.

Figure 63 -
**Redear
Sunfish**

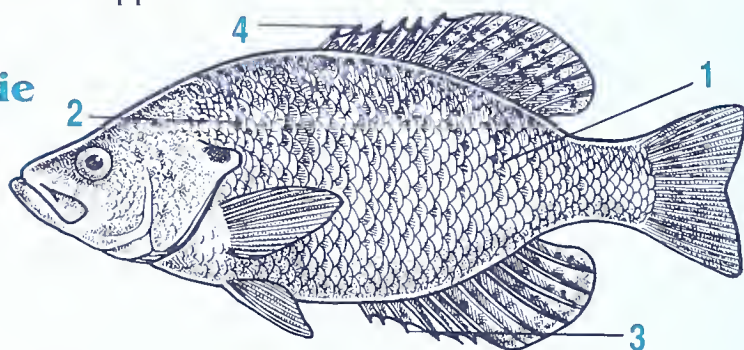


1. Back and upper sides olive green to lighter olive on sides; dark olive spots on sides; breast and belly yellowish.
2. Gill flap short; black, bordered with bright red or orange on lower rear corner.
3. Pectoral fin long and pointed.

The **white crappie** (*Pomoxis annularis*) may reach 18 inches. The upper part of the head, back and sides are dark silvery blue green, olive green, or brownish, shading to lighter bright green to silvery on the sides. The belly is silvery white. Some of the side scales are darkened to form a series of indistinct vertical bars. Darker spots or vermiculations mark the dorsal, caudal and anal fins. This species is more tolerant of turbid waters than the black crappie.

Figure 64 -

White Crappie

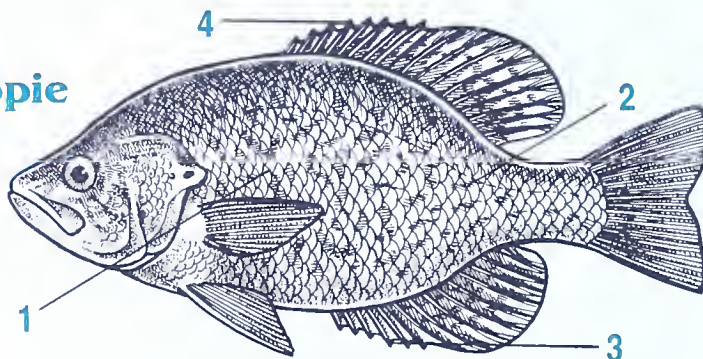


1. Head, back and upper sides dark greens or brownish, shading to light green or silvery lower sides; belly silvery white.
2. Spots may form 7 to 9 vertical bars.
3. Six anal spines.
4. Six dorsal spines.

The **black crappie** (*Pomoxis nigromaculatus*) grows to about 16 inches. The upper part of the head, back and sides are metallic olive to greenish or golden brown with a silvery-blue sheen. The sides shade to a brighter silvery green on the sides above a silvery-white belly. The sides are noticeably marked with variously connected black vermiculations and spots. The head may be somewhat spotted or dusky, and darkens considerably in males during the breeding season. The dorsal, caudal, and anal fins are conspicuously marked with black and white or pale greenish vermiculations.

Figure 65 -

Black Crappie



1. Back and upper sides olive to greenish or golden brown with silvery-blue sheen; sides brighter silvery green; belly is silvery white.
2. Black spots scattered irregularly.
3. Six anal spines.
4. Seven or eight dorsal spines.

THE PERCHES

(Family Percidae)

Twenty-two species of this family have been recorded in Pennsylvania, but several are either very rare or no longer occur here. The **blue pike** (*Stizostedion vitreum glaucum*), generally considered a subspecies of the walleye, is now considered extinct. The **eastern sand darter** (*Ammocrypta pellucida*) is one of a number of species listed as endangered in Pennsylvania. The majority of the species are small and belong to a group called darters. All have one or two spines in the anal fin.

While most members of this family are stream dwellers, the two largest species of main concern to anglers are more often found in lakes or ponds.

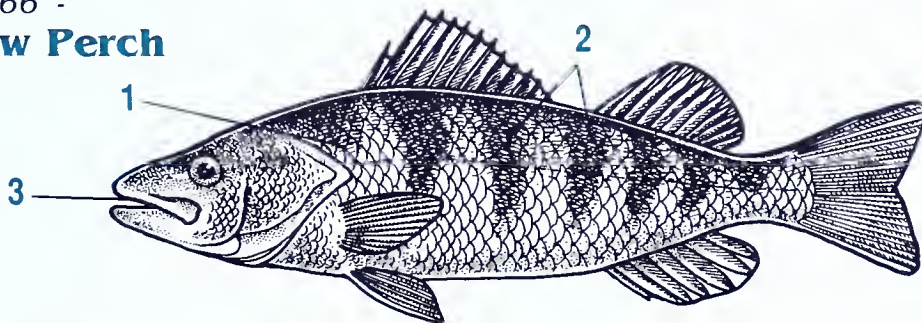
Some spawning may occur in late summer, but spring is the usual spawning season for most species. The eggs are buried in, or broadcast over, gravel, sand or algae in stream riffles by most darters. The walleye spreads its eggs over rocky or weedy lake or pond shallows, while yellow perch eggs are draped in gelatinous strings over submerged vegetation. Eggs of the swamp and least darters are deposited singly on submerged vegetation. Johnny and tessellated darters deposit their eggs under rocks which then are guarded by the male.

Though many of the darters are important as forage for other fishes and as water quality and habitat indicators, the walleye and yellow perch are highly regarded for their sporting and eating qualities. Large numbers of walleye fry and fingerlings are produced through artificial propagation for fisheries management programs.

The **yellow perch** (*Perca flavescens*) may reach a length of 14 inches. The upper part of the head, back and sides may be bright olive green to golden brown. This shades to a lighter yellow green to yellow above the white to grayish undersides. Some of the back and side scales are darkened to form six or seven prominent vertical bars on the sides. The normally amber to pale yellow or silver-white pectoral, pelvic and anal fins become orange to red orange in males during the breeding season.

Figure 66 -

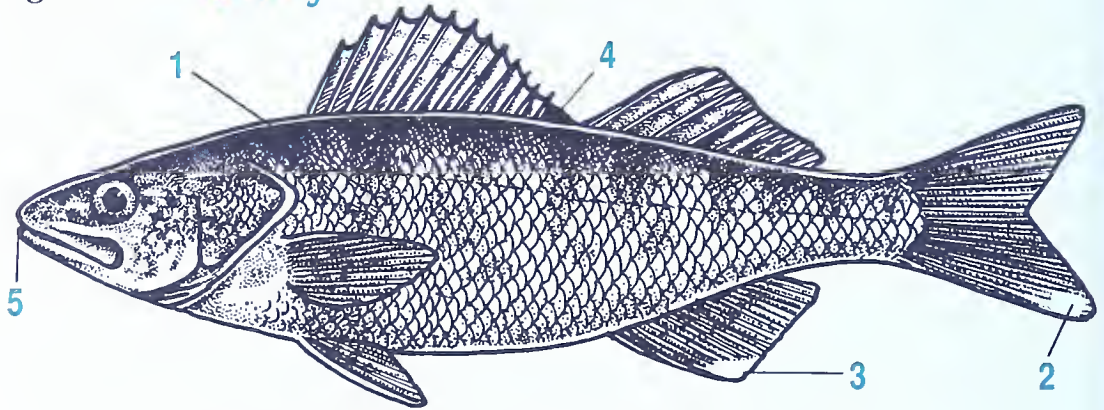
Yellow Perch



1. Head and upper sides bright olive green to golden brown, shading to lighter yellow green or yellow. Belly grayish to off-white.
2. Six or more dark vertical bars on sides.
3. No sharp pointed teeth on lower jaw.

The **walleye** (*Stizostedion vitreum*) can reach lengths of 30 to 36 inches. The upper part of the head, back and sides are olive brown, golden brown, or yellow, shading to lighter hues on the sides. The side scales may be gold-flecked above the white or yellowish undersides. The sides of the head and body sometimes are marked with obscure mottling or blotches that form indistinct vertical bars in individual specimens under 14 inches. The lighter body color may be bluish, greenish or gray in some individuals. The spinous dorsal fin membranes are dusky to clear or indistinctly spotted; a blotch of dark pigment appears on the lower, rear margin. The tip of the lower lobe on the tail is white. The lower edge of the anal fin also is white. The eyes appear silvery due to reflections which come from a light-sensitive layer on the rear of each eye.

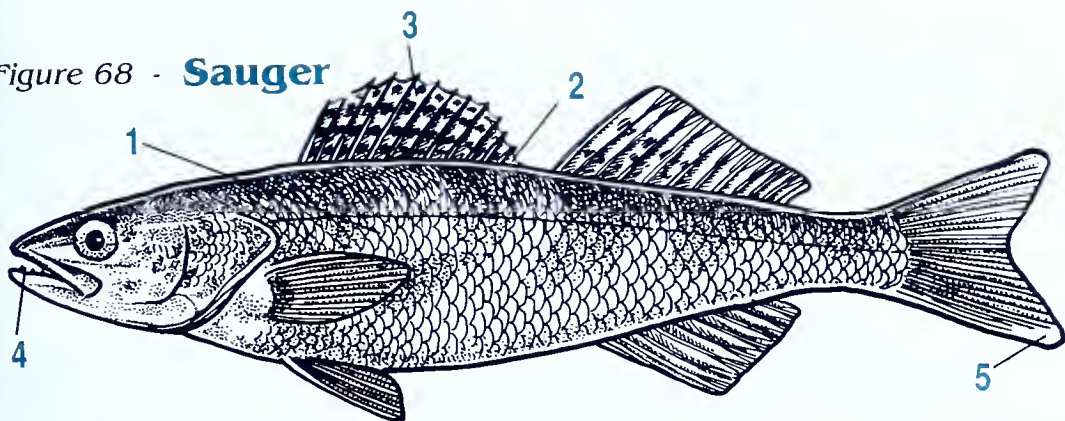
Figure 67 - **Walleye**



1. Body brassy, yellow olive to golden brown; may have indistinct vertical bars.
2. White tip on lower lobe of tail.
3. Lower edge of anal fin white.
4. Large black blotch at rear base of spinous dorsal fin.
5. Sharp pointed teeth on lower jaw.

The **sauger** (*Stizostedion canadense*) may attain a length of 15 to 20 inches. The upper part of the body is pale yellow brown or dull brown to gray, shading to paler hues on the sides. The belly is white. The back may be marked with three or four dark saddles and the sides with irregular, roundish dark blotches. The spinous dorsal fin does not have the dark blotch at its hind corner commonly found on the walleye; it is, however, conspicuously marked with regular rows of dark spots. The soft-rayed dorsal fin is marked with several bands of darker color. The tip of the lower lobe of the tail is sometimes whitish. Like the walleye, the eyes of the sauger are silvery due to reflection of light. The sauger seems to prefer large, shallow lakes and large, slow-flowing rivers, but tolerates waters more turbid than preferred by the walleye.

Figure 68 - **Sauger**



1. Upper part of body pale yellow brown to gray, shading to lighter hues on sides; belly is white. Back and sides may have darker saddles or blotches.
2. No dark spot at base of spinous dorsal fin.
3. Spinous dorsal fin marked with rows of dark sots.
4. Sharp pointed teeth on lower jaw.
5. Tip of lower lobe of tail sometimes whitish.

“Saugeye” is a name applied to the walleye-sauger hybrid that occurs naturally, but which also is produced artificially in the hatchery. The adult sizes of the hybrid falls somewhere between those of its parents, and the characteristics used to separate the parents are variably present in the hybrids.

THE DRUMS

(Family **Sciaenidae**)

The freshwater drum is our only representative of a large group of marine species found in temperate and tropical coastal waters around the world. The lower pharyngeal arches are heavy and fused in our species and bear flat, molar-like teeth. The spiny and soft-rayed portions of the dorsal fin are narrowly joined; the spiny-rayed portion is shorter than the spinous section. The lateral line continues to the end of the tail fin.

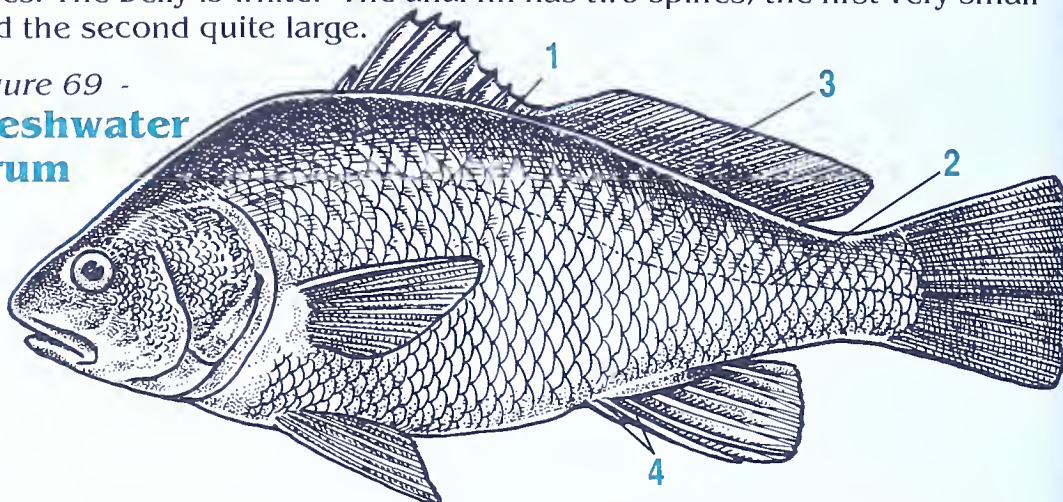
While some of the marine members of this family are called croakers because of the sounds they produce, Pennsylvania’s freshwater drum produces a drumming sound by using muscles attached to the air bladder. These sounds are produced most often during the summer breeding season, when spawning takes place in relatively shallow portions of lakes or the backwaters of streams. The eggs are very small and numerous, and, unlike those of our other fishes, are so buoyant they float on the water’s surface.

The young grow rapidly at first, but most of our drum do not reach 20 inches even after more than 10 years of growth. Economically, the species is mostly valued in a commercial sense. The pharyngeal teeth allow it to feed on mollusks, but it also feeds upon insects and other invertebrates.

The **freshwater drum** (*Aplodinotus grunniens*) is dark green to olive brown on the upper part of the head, back and sides shading to silvery on the sides. The belly is white. The anal fin has two spines, the first very small and the second quite large.

Figure 69 -

Freshwater Drum



1. Body dark green on upper part, shading to silvery on sides; belly is white.
2. Lateral line continues to end of tail.
3. Soft-rayed portion of dorsal fin much longer than spiny-rayed portion.
4. First anal fin spine very small; second spine very large.

THE SCULPINS

(Family Cottidae)

Three freshwater species of this family of mostly marine forms have been recorded in Pennsylvania waters. In addition, two other species recorded on the Canadian side of Lake Erie may also occur in Pennsylvania's portion of the lake. All are bottom-dwelling forms with large, flattened heads and large pectoral fins. The body is largely scaleless, although there are some scattered areas having small, sharp scales called prickles.

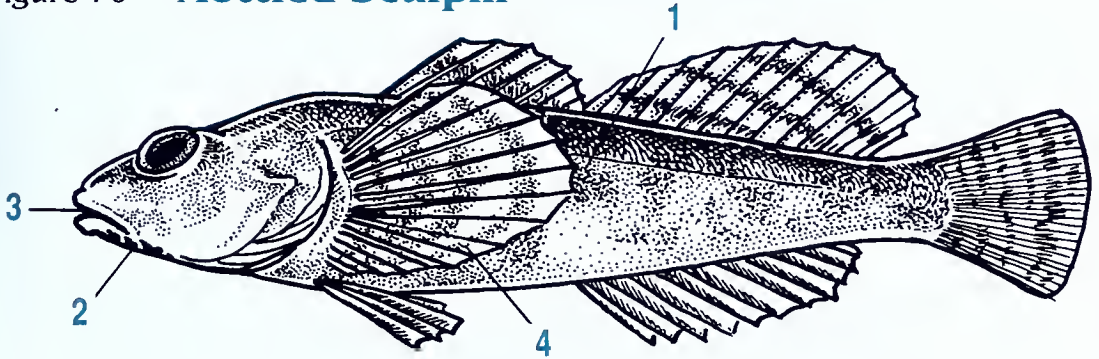
Although Pennsylvania species are primarily stream dwellers, some also occur in lakes. These environments are invariably cold and well oxygenated waters, so sculpins often are present in many of our trout waters. They move about over the bottom in short spurts, feeding largely on invertebrates dwelling there.

Lake Erie species apparently are preyed upon by lake trout and burbot. Other species provide food for trout, bass and pike and are used by anglers as bait for these game fishes.

The mottled sculpin (*Cottus bairdi*) and the slimy sculpin (*Cottus cognatus*) are the two most common and most widespread species in Pennsylvania. The mottled sculpin is found principally in the Ohio River and Susquehanna River basins; the slimy sculpin is found primarily in the Susquehanna River and Delaware River basins.

The **mottled sculpin** is light to dark brown with darker mottling on the back and sides. The belly is a paler brown or even whitish. The chin usually is irregularly marked with a dark pigment, and the dorsal, caudal, pectoral and anal fins also are well marked with spots and streaks of a darker color. A short patch of teeth is present on each of the paired (palatine) bones in the forward roof of the mouth.

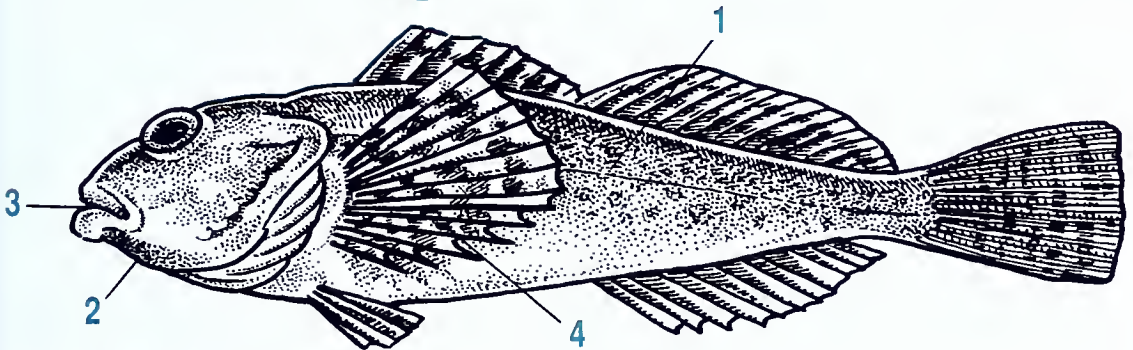
Figure 70 - **Mottled Sculpin**



1. Body shades of brown with darker mottling on back and sides; belly a pale brown or whitish.
2. Chin irregularly marked with dark pigment.
3. Teeth on palatine bones in roof of mouth.
4. Much enlarged pectoral fins.

The **slimy sculpin** is dark brown with a darker mottling, becoming lighter on the sides. The sides blend into a whitish belly. The spinous dorsal fin is dark at the base and clear along the upper edge. The second dorsal fin, caudal fin and anal fin may be lightly barred, while the pectoral fins are widely barred. The chin is uniformly colored. No teeth are present on the palatine bones.

Figure 71 - **Slimy Sculpin**



1. Upper body dark brown with darker mottlings, sides become lighter; belly whitish.
2. Chin uniformly colored with dark pigment.
3. No teeth present on bones in roof of mouth.
4. Much enlarged pectoral fins.

GLOSSARY

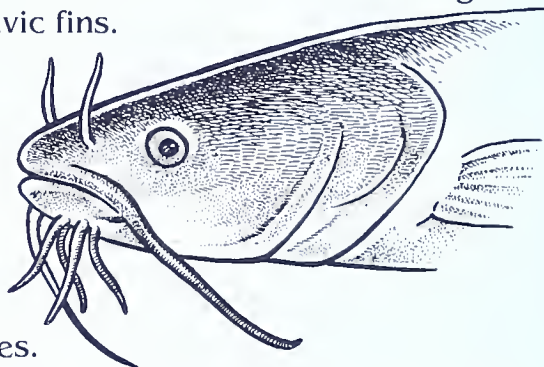
Adipose fin. Small, fleshy fin on the back and near the tail of certain fishes.

Anadromous fish. Fishes living in the ocean (or other large body of water) but which enter freshwater (in the case of lake dwellers, smaller) streams to spawn.

Anal fin. Single fin on underside of fish between the vent and tail.

Axillary process. Elongated, membranous material occurring at base of pectoral and pelvic fins.

Barbel. Slender, fleshy projection on the head, usually around the mouth; includes tactile (sensitive to touch) organ.



Bony plates. Hard, heavy scales.

Branchiostegal rays. Small, slender bones which support the gill membranes.

Catadromous fish. Fishes living in freshwater streams, but which return to the ocean to spawn.

Caudal fin. Tail of a fish.

Dorsal fin. Fin on the back of a fish; may be divided into parts on some species.

Estuary. Mouth of a river where its fresh water mixes with salt water and is affected by tides.

Fauna. Animals living in a particular area.

Fingerling. A young fish, older than fry, but usually not more than one year of age.

Fry. Newly hatched fish; usually in various stages of progression: sac fry, swim-up fry, fry, fingerling; length of stages may vary with species.

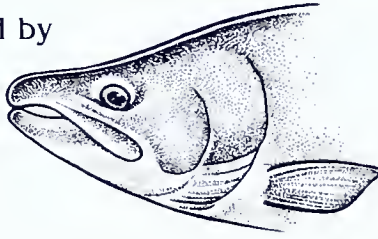
Gill arches. Bony structures that give internal support to the gills, also called pharyngeal arches.

Gills. Organs through which oxygen is absorbed from the water; protected by gill cover called opercle or operculum.

Hybrid. Offspring resulting from breeding between parents of two different species.

Invertebrates. Animals without a spinal column (backbone).

Kype. Hooked jaw acquired by trout and salmon, especially at spawning time; it is comprised of cartilage.



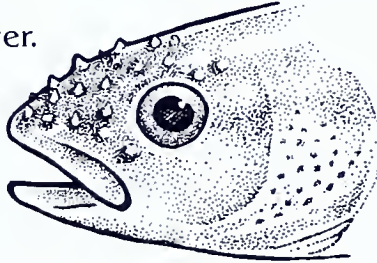
Lateral line. Line of scales running lengthwise on each side of a fish with openings or pores connected to a sensory canal.

Maxillary. Hindmost corner bones of upper jaw.

Migrate. Move periodically from one area to another to live, spawn or feed.

Opercle or Operculum. Gill cover.

Pearl organs. Horny structures protruding from the head or scales; developed during the breeding season.



Pectoral fin. Uppermost fins on either side of the body and usually just behind the gill.

Pelvic fin. Fins on either side of the body, below and often behind the pectoral fins.

Pharyngeal arches. See ***gill arches.***

Pharyngeal teeth. Teeth-like structures found in the throat, attached to the gill arches. See ***gill arches.***

Protractile. To be thrust outward or extended.

Ray. Bony structure supporting the membranes of the fin.

Soft-ray. Flexible, jointed rays supporting a fin.

Spine. Sharp, pointed structure.

Spiny-ray. Stiff, hard and unjointed bones supporting a fin.

Swim-up fry. Newly hatched fry in early stage of swimming up for feed after absorption of egg or yolk sac is complete.

Tooth patch. Group of small teeth located on the base of the tongue.

Turbid. Opaque; muddied; caused by suspended matter, usually sediment or the result of rain runoff.

Vertebrae. Spinal column; the backbone.

Vertebrate. Animals having a spinal column or backbone.

Vermiculation. Irregular, wavy, worm-like lines.

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